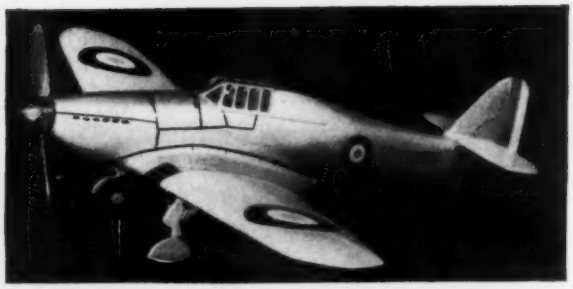
MODEL AIRPLANE NEWS

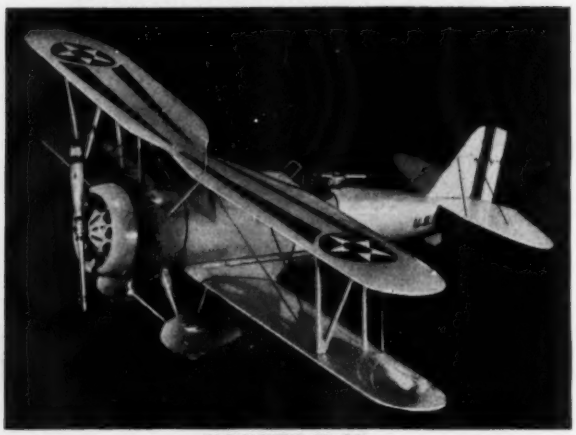
8th Year of Publication

SEPTEMBER
1936
20c

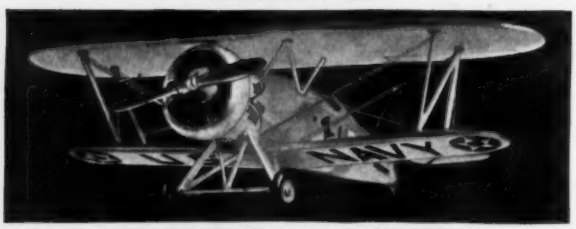
Blériot-Spad 510 Fighter



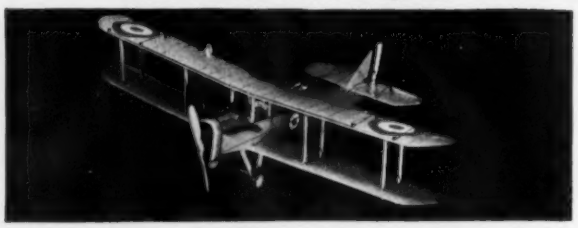
HAWKER SINGLE-SEATER FIGHTER



VOUGHT V-65



BOEING F4B-4 (re-designed)



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See Note

Boeing Bomber Kit wingspan 18½ inches, in Balsa $1.00 See Note

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¼ INCH SCALE RAILROAD CAR KITS WILL RUN ON O GAUGE TRACK

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FRUIT GROWERS EXPRESS as used on B. & O.
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ILLINOIS CENTRAL Refrigerator.
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SANTA FE Refrigerator Car.
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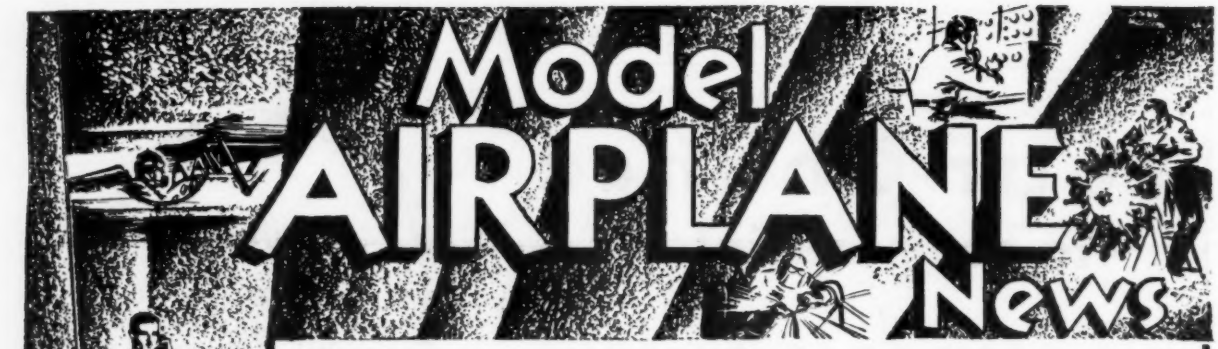
Complete Kits for the Above Cars, Each $3

See Note



8th YEAR OF PUBLICATION

VOL. XV *No. 2*

Edited by Charles Hampson Grant

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SEPTEMBER, 1936

In Our Next Issue

Plans and building instructions will be given to build one of the finest gas jobs in looks and performance that we have ever seen in **Building The T-D Scout**, by **Theodore Dykzeul.**

Will the Bomber Replace the Pursuit Plane? by Lieut. H. Latane Lewis II, gives you an insight into the circumstances which dominate this important question.

A truly excellent flying scale model is presented by William Winter in **How You Can Build and Fly the SOC-1 Navy Scout**, a biplane with unusual flying characteristics.

Joe Kovel concludes his suggestions for "gas" fans in **Ways and Means of Gas Model Success.**

A series of **Useful Airfoil Sections** will be presented that will enable you to choose the right one for your model.

The third **Navi-Goid** contest will sharpen your wits in aerial navigation and possibly bring you an award.

Gas Lines, Air Ways and Aviation Advisory Board will bring you news and answer many puzzling questions.

How to Design Your Fuselage Model, Part II, by Charles H. Grant, will clarify many doubtful points of design.

Frontiers of Aviation, by Robert C. Morrison gives you up-to-date information on large plane production.

Hints and 3 views make this an invaluable issue.

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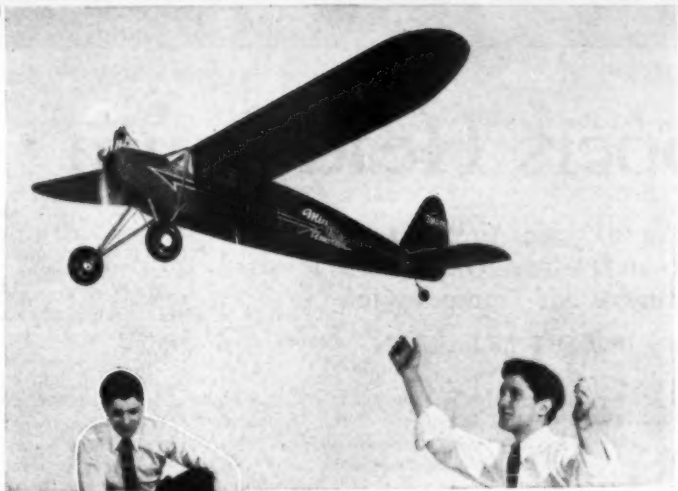

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★ WEIGHT 4½ LBS.
★ 22 MINUTES ON 1 OZ.
★ 18 to 1 GLIDE

COMPLETE KIT
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$7.50 Postpaid

NOTHING ELSE TO BUY!

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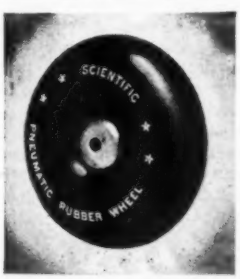

SCIENTIFIC PNEUMATIC RUBBER WHEELS

Same as included in Miss America Kit.

Lightweight, Puncture Proof, Shock Proof.

For use on models with 3 to 8 foot wingspan. Black tires with aluminum painted hubs. Size 3½".

Per pair..... **$1.50**

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The best way to hook up outside batteries. Can be unhooked in a jiffy by simply pulling out plugs. Per set..... **25c**

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Firm contact. Size of base ½"x 1¼".
2 poles...25c each
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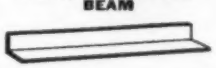

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3 oz. bottle	25c
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Five Foot Lengths

⅛x⅛	$.03	⅜x⅜	$.10
⅛x¼	.04	½x½	.12
⅛x⅜	.06	½x¾	.15
⅛x½	.07	½x1	.18
3/16x3/16	.05	¾x¾	.15
3/16x⅛	.08	¾x1	.20
¼x¼	.06	1x1	.25
¼x⅜	.08		

SHEET BALSA

Five Foot Lengths

1/32x2	$.10	3/16x2	$.18
1/32x3	.15	3/16x3	.25
1/16x2	.12	¼x2	.20
1/16x3	.18	¼x3	.25
⅛x2	.15	⅜x2	.28
⅛x3	.20	⅜x3	.33

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3 ply—1-32" thick

Thinnest ply-wood made, being 3 ply and only 1-32" thick	3"x12"	$	.15
	6"x12"		.25
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	12"x24"		.85

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Add 20c to all orders that contain balsa or wire in 5 foot lengths to cover special handling.

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The giant Martin China Clipper powered with four 800 hp. engines which is flying the Pacific routes (McLarren)

The Clippers Head South

How the Trans-Pacific Air Lines Have Been Established and What They Mean to the Future of Air Transportation

By ROBERT McLARREN

THE glamorous and romantic flights of the "China Clipper" out across the trackless wastes of the Pacific, touching small bits of land here and there, has meant much to the isolated island of the mid-Pacific, linking them into an invisible chain of the strongest type; friendship. Straight westward, ever westward pointed the nose of the trail blazing ship as she roared like a winged Magellan into the setting sun, bearing hundreds of pounds of mail, cargo and human life. Now, the westward chain has been completed, the final link has been wrought and it remains now for only the scheduled trips to bind the Pacific in an unbroken westward line of airlanes.

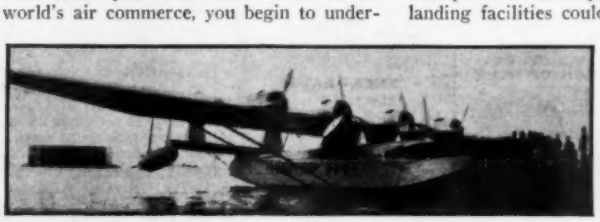
The engineers, the scientists, the airmen who have made this dream of man possible, now turn their eyes in another direction . . . southward. Consider the geography of the Pacific. The principal islands lie in a rough triangular shape with one point at California, another at China, the third at Australia. By connecting these rough lines on the map, you will find you have actually touched or nearly so, the most important islands, both commercially and geographically, of the scattered bits of habitation in the Pacific Ocean. Along the base or upper leg of the triangle, we see a line running horizontally across the Pacific from Oakland to Hong Kong. Roughly we find Hawaii, Midway, Wake, Guam, and the Philippine Islands, the present stops of the Pan American Clippers. Consider next; Australia, a thriving, industrial sub-continent, almost a nation in itself, and one of the principal possessions of the British Empire. Think of its possibilities as a link in the round-the-world air line which is not too many years hence. New Zealand, a 1,500 mile jaunt from Australia and an important link in the world's steamship lines, should not be entirely omitted from our consideration. When you realize their value to the world's air commerce, you begin to understand just why the Clipper is heading south.

From Hawaii to Australia is our next step. "But how?" is the natural question. Once more lay your map of Oceania before you and draw a straight line from Honolulu to Sydney. There is the theoretical answer to your problem! Here is the practical one; the air line distance between these two points is approximately 5,200 miles! The range of the China Clipper and her sister ships is 4,000 miles! There remains but one alternative, the division of the distance into two or three smaller hops. At the outset this appears to be a rather simple problem. Taking into consideration that for safety's sake the Clipper is not permitted to make a flight longer than 2,000 miles, (Pan American's present policy), we merely draw a 2,000 mile radius from Hawaii, select the islands nearest this radius, set up our base and begin operations! Unfortunately this obvious answer to our problem does not take into consideration the fact that for every island in the Pacific, there is an owner, two, even three in some cases. You also have an answer to that one; select only those islands belonging to Uncle Sam! Simple, isn't it? So thought the engineers who sought to solve this problem.

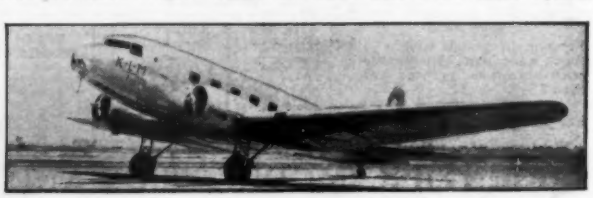
Within our first 2,000 mile radius lies Fanning, Christmas, and Jarvis Islands, all possessions of the United States government. Fanning Island, 1,190 miles from Honolulu was selected as the first stop, to be followed by Jarvis Island, a short 365 mile jaunt. After this tentative selection, the next step was the careful observation of these two islands. What weather conditions were prevalent? Are the islands susceptible to earthquakes? What type of landing facilities could be provided? What are the living conditions in case a crew was to be stationed there? These important questions had to be answered before bases could be established.

Several months ago Eugene Vidal, director of Air Commerce, called into conference a small group of his most trusted colleagues. "Gentlemen," he began, "Do you think that you can find a group of young men who will give up a year of their lives to spend it on a lonely, barren, deserted island in the South Seas, far from the beaten track of steamship routes, to engage in governmental scientific experimentation?" Working closely with Pan American Airways, Vidal placed the services of his entire Bureau of Air Commerce with their skilled engineers and trained scientists at the disposal of the huge air line. His question was answered with an enthusiastic reply in the affirmative. "Very well, proceed at once to Fanning and Jarvis Islands and set up observation bases there," directed Mr. Vidal. But where were they to find men not only capable of recording these complicated instruments but also capable of withstanding the intense heat and barren land of these isolated spots? A young man could be trained in the use of the delicate sicentific instruments but he would have to be born in the sweltering heat of the tropics in order to bear it. Native Hawaiians, then, was the answer. It was the work of but a few short weeks until the party had selected their recruits, trained them, and were sailing on the great adventure.

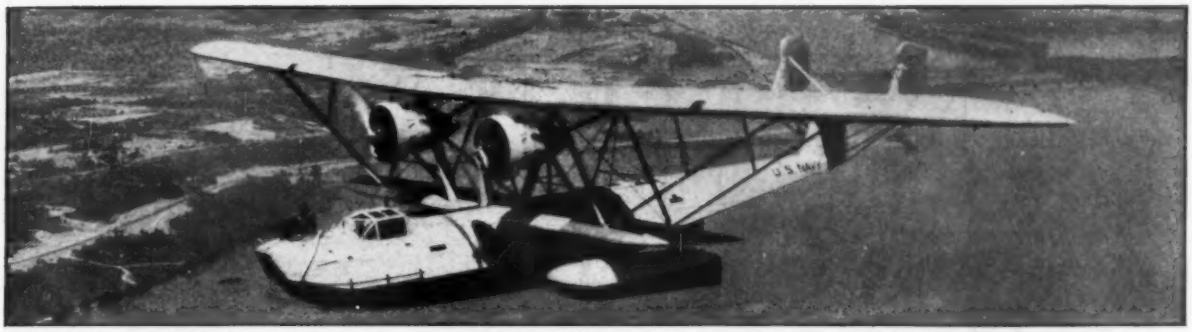
The little ship, with its small band of intrepid adventurers sailed slowly across the breathless expanse of motionless and depthless water, its wake spreading in a giant "V" to the rear. Coats came off, shirts came off, the men panted in the unbearable heat of the tropic zone. As the ship moved slowly through the equatorial belt, those on board were surprised to find the ship drop anchor alongside a small patch of desert not more than a few miles square,



The Sikorsky S-42 Clipper, one of the first planes to fly the Trans-Pacific Route

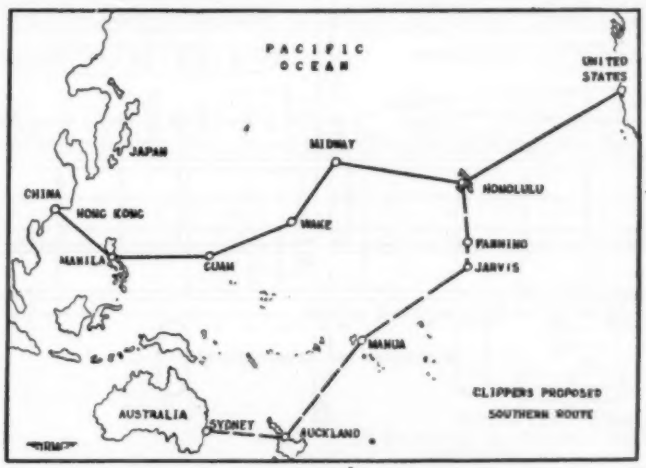


The type of Douglas plane Lady Kingsford-Smith will use on Tasmanian Airways



The Navy XP2Y-1 which pioneers the route from California to Hawaii in a formation flight

no trees, no grass, nothing whatever growing . . . just sand. "But Captain"; questioned the expeditioners, "why are we stopping here?" "Gentlemen," began the old skipper, "this is Fanning Island." Their jaws dropped, a look of utter despair and dejection appeared on their faces. Then one jaw snapped shut, then another, and with the courage which has marked the progress of the Clippers' march across the Pacific and made it possible, the men put out in a boat loaded with supplies. After two days, camp had been made, the instruments were up, and final instructions had been given. "We will send a boat with supplies for a report every 30 days, until then, good luck," was the announcement of the leader and the ship sailed away into the fast gathering dusk, leaving five young Hawaiians alone on a deserted island far out in the mid-Pacific with nothing but their guitars and the ever whirling anemometer to entertain them.



Whatever may have been found on Fanning Island was found two-fold on Jarvis Island. It is but a spot on the landscape, lying 40 miles below the equator, one of the world's most forsaken spots where the searing flame of the sun bakes the sand into knife-like particles and the very souls of men are tortured. Only the canvas of their tents to protect them and their own courage to prevent the maddening influence of death. Once more the ship sailed into the horizon leaving five more young natives virtually marooned on nature's hell-zone.

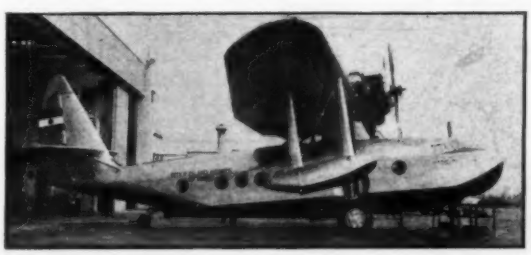
Then; the unexpected: A short, curt message from London asking Uncle Sam just what right he had to trespass on British property without official permission. British property? Impossible! These islands belonged to the United States! But did they? Truly, here was the unexpected! Records were dug up, files were searched; turmoil moved through offices as log books and data sheets were checked and rechecked. Messages were flashed to England, more messages flashed back. Who owns Fanning, Christmas, and Jarvis Islands? That was the question on everyone's lips. Then came a solution. But, for a few brief seconds, let's scan the history of the islands.

Jarvis Island was originally discovered by Sir James Henry James, a member of Captain Cook's party about 1742 and was named for his son, Jarvis. Sailing northward to meet his commandant, he discovered Christmas and Fanning Islands, naming them for the season he ventured upon them and for his chief officer respectively. He claimed them for good King George II and sailed on his way. At that time there was a maritime law to the effect that all lands claimed by an explorer for his native land and duly recorded and sworn to, became the possession of the claimant's country without restrictions. However, due to the multitudinous voyages of discovery prevalent at this and later periods, a considerably confused imperialistic condition existed throughout the world, particularly the South Seas. It was not until about 1800, by which time nearly every island had been discovered and rediscovered half a dozen times that the maritime law was changed to read that all lands discovered by a nation and claimed by her must be occupied by citizens of that nation in order to present a just claim for legal ownership.

With the passage of this law, England began scouring her country for persons willing to be transplanted to a new habitation. A year passed with only a few settlements. England became desperate. Her discovered lands were being rapidly eaten up by rival nations who were organizing settlements on all available islands. In final desperation, England threw open her prisons and shipped her prisoners about the world dropping them off on all available islands she had just claim to. The larger possessions came first. Australia became a large penal colony, New Zealand, the Fiji Islands, all became important British possessions.

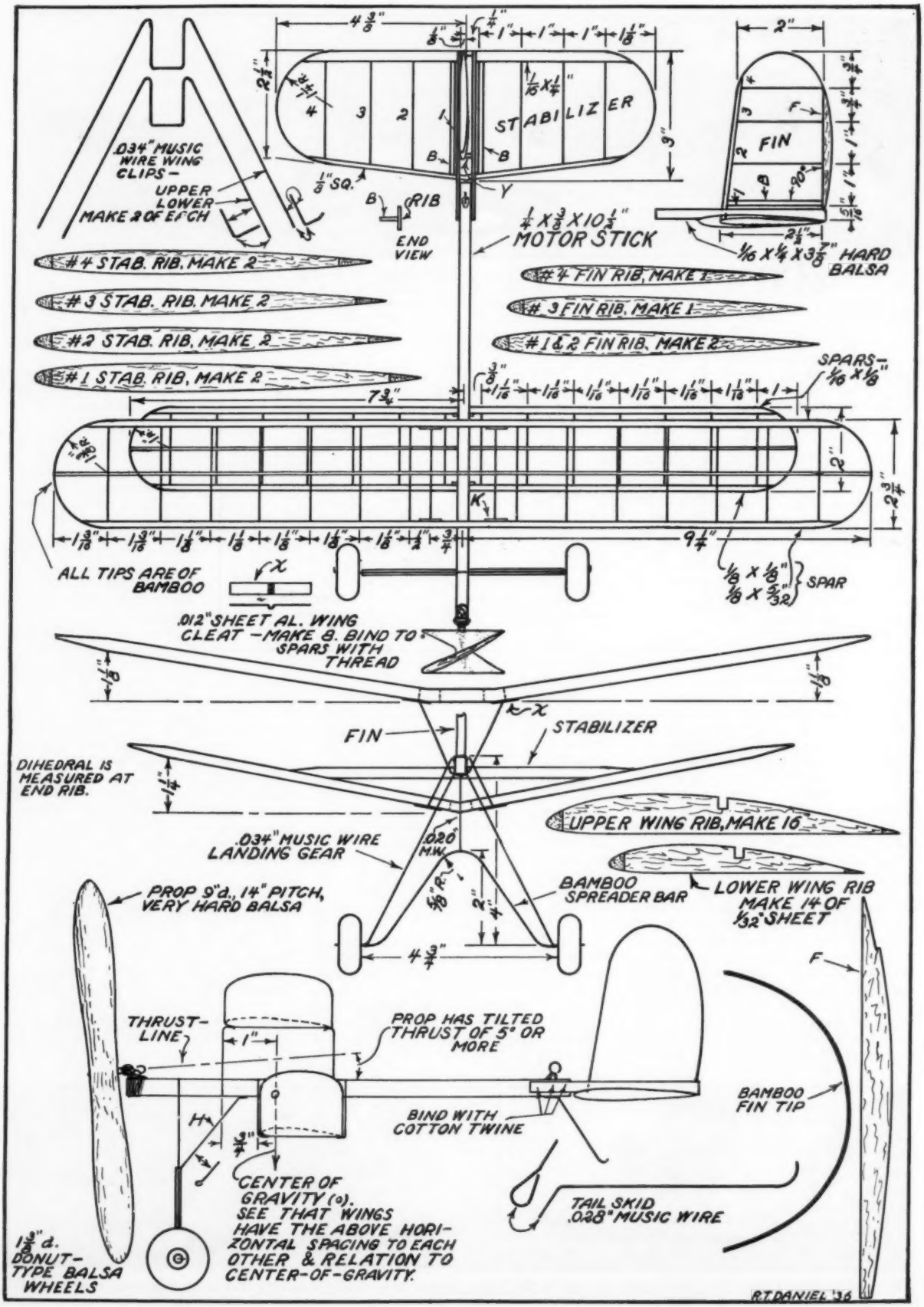
It is a matter of history, however, that England never quite got around to settling the three mile square of desert sand known as Jarvis Island nor did she land anyone at either Fanning or Christmas Islands.

(Continued on page 40)



The Sikorsky Baby Clipper S-43 which is being used in the Hawaiian inter-island service

The famous Navy Consolidated XP3Y-1 of a commercial version is being rushed to completion


.034" MUSIC WIRE WING CLIPS— UPPER LOWER MAKE 2 OF EACH
STABILIZER
FIN
RIB
END VIEW
MOTOR STICK
HARD BALSA
#4 STAB. RIB, MAKE 2
#3 STAB. RIB, MAKE 2
#2 STAB. RIB, MAKE 2
#1 STAB. RIB, MAKE 2
#4 FIN RIB, MAKE 1
#3 FIN RIB, MAKE 1
#1 & 2 FIN RIB, MAKE 2
SPARS—
ALL TIPS ARE OF BAMBOO
SPAR
.012" SHEET AL. WING CLEAT —MAKE 8. BIND TO SPARS WITH THREAD
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STABILIZER
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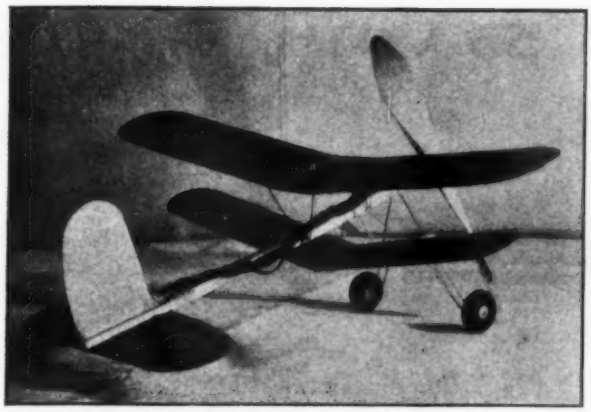
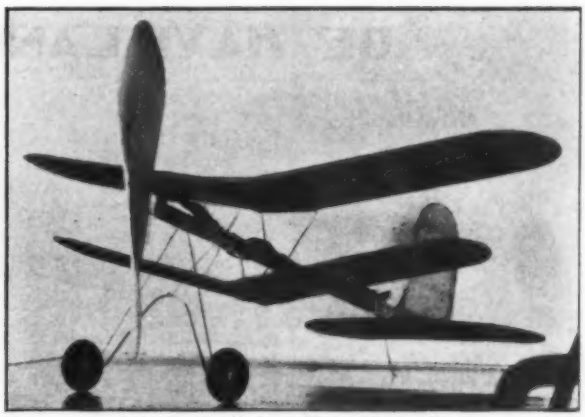
BAMBOO SPREADER BAR
LOWER WING RIB MAKE 14 OF 1/32" SHEET
PROP 9"d., 14" PITCH, VERY HARD BALSA
THRUST-LINE
PROP HAS TILTED THRUST OF 5° OR MORE
BIND WITH COTTON TWINE
BAMBOO FIN TIP
TAIL SKID .028" MUSIC WIRE
CENTER OF GRAVITY (o). SEE THAT WINGS HAVE THE ABOVE HORIZONTAL SPACING TO EACH OTHER & RELATION TO CENTER-OF-GRAVITY.
1 3/8" d. DONUT-TYPE BALSA WHEELS
R.T. DANIEL '36



The finished model with large tail for stability



It is very realistic and a consistent flier

Build and Fly This Simple Biplane

Here's How You Can Create an Experimental Model That Will Give You Hours of Pleasure and Many New Ideas

RALEIGH T. DANIEL

FOR those who like to build and fly stick models, we offer an interesting design of a rugged little biplane. It will prove a worthy addition to your squadron of flyers. You will find it easy and inexpensive to make. Start now to build this snappy model and if correctly done, you will have a ship that will rate high both in looks and performance.

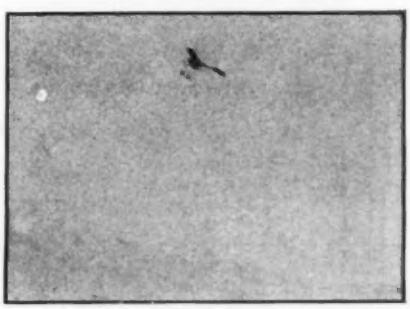
Several new features are embodied, including an arched bamboo spreader bar. This type of landing gear is found to be very successful in that it will absorb hard landing shocks without damage. Whereas it will spring and flex in landing, it doesn't have a tendency to become permanently bent out of shape such as the plain type of wire struts. Also easier and better wheel alignment is obtained when a spreader bar is used.

Draw a full-sized layout for the wings, tail units and other parts which require full size to work over. These can be attached to a drawing board or other suitable surface and used as an outline over which to build. The writer highly favors the use of a drawing board as it will be worth its price many times over. A good used board will serve the purpose or even a new one is not expensive and if cared for will last for years.

Wings

Make two rib templates, one for each wing. Use tracing paper to copy the patterns on the drawing. Cut out your tracings and cement them on 1/32" hard sheet balsa. When dry, cut out and sand down to the outline of the tracing. Check your templates on the drawing. After perfect shape is attained, give the templates one or more coats of tissue cement. This will protect them from becoming nicked or having the essential shape destroyed while in use.

Make the ribs of 1/32" medium sheet balsa. Arrange the ribs evenly in a stack and drive in pins from each side to hold them firmly together. This operation must be carefully done. The entire set



The model in actual flight at 5000 ft. Pike's Peak is in the background

of ribs (either upper or lower) are now sanded as a unit, thus obtaining uniformity. Check them with the template or drawing. The slots for the 1/16 x 1/16" center spars are cut in at this time. Also cut off then true up by sanding, the nose and trailing tips of the ribs the amount required to accommodate the front and rear spars, respectively.

Use 1/32 x ¼" bamboo strips from which to bend the wing tips. In this way both tips for one wing are bent at once and also identical shape is obtained. Heat applied in bending the bamboo may be of any method you desire. When bent, cut off to the proper length and split out two pieces 3/64 x 1/32".

The parts of the wing may now be placed over its drawing and assembled. Pins, thumb tacks, various articles and utensils can be brought into valuable use to hold parts in place during the process of assembly. But take heed, be sure they are all your own for if some member of your household sees her tweezers supporting a wing spar, she is sure to remove it while the cement is still wet!

Do not put in the ribs at the center until after the dihedral is set. This will allow the ¼" long pieces of the 1/16" balsa sheet, indicated on the drawing as "K," to be cemented in place on the spars. "K"—4 on the upper wing—2 on the lower wing, are used to strengthen the spar at the points where the dihedral is put in and to effectively hold the proper dihedral setting. After the cement is dry, "K" is cut down to agree with the shape of its respective spar. "K" is also indicated on the front view drawing by dotted lines. The ribs which come in at these points must have each tip cut off an amount equal to the thickness of "K." Sand the spars to shape after the wing is assembled.

Setting the wing dihedral is a very important point in its construction as it is during this operation that one wing tip or both may get out of alignment with the center-section and thus make good performance impossible. This of course refers to general cases where alignment throughout is desired.

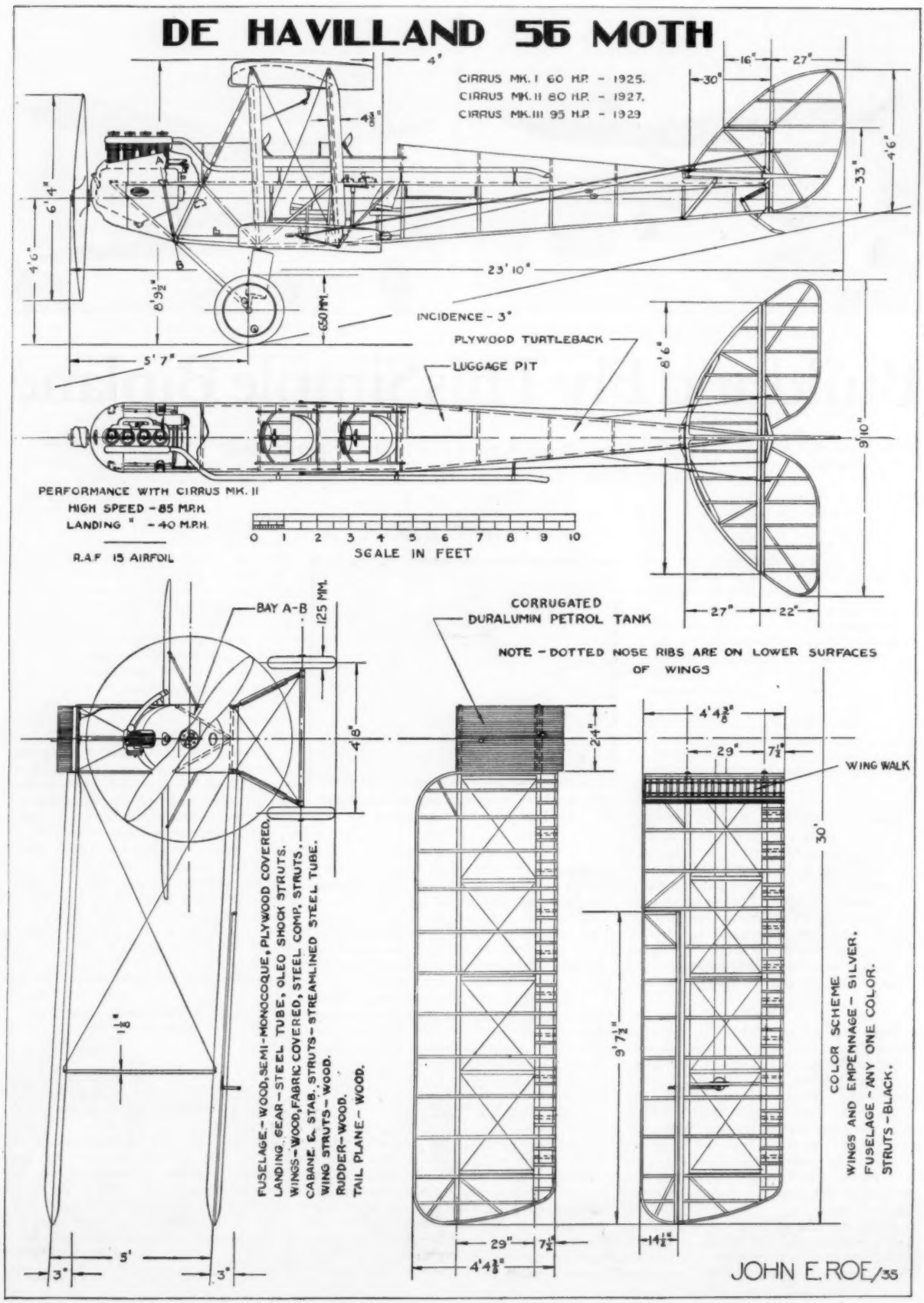
Wing cleats "X" are made of .012" sheet aluminum. These cleats are bent as shown so as to receive the end of the wing clip. Make 8. They are attached in the proper places on the wing spars, using thread and cement. These cleats will prove extremely valuable in securing the wire clips to the spars and may eliminate a lot of grief. But the wire must fit in snugly. The wings are now ready to be covered.

Tail Unit

Templates made of tracing paper alone will be sufficient by which to cut the fin and stabilizer ribs. Sand and compare the shape of the ribs by the drawing. The bamboo tips on the tail are the same thickness as used by the wing and are made in the same way. No. 1 ribs of the stabilizer and fin have a 1/32 x ⅛" balsa strip "B" cemented along their sides and at right angles. This combination forms a sort of "T" construction, see "END VIEW," the purpose of which is to pre-

(Continued on page 34)

DE HAVILLAND 56 MOTH



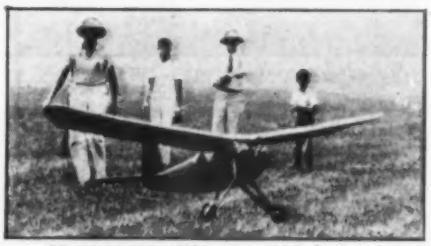
The 1936 "Nationals"

Highlights and Complete Results of the Annual International Model Airplane Competition

Just a part of the throng of spectators and contestants at Wayne County Airport on the second day of the contest. A gas job is being fueled and Bruno Marchi looks doubtfully at a plane in flight

THE 1936 National Championship Model Airplane Meet was the biggest event of its kind ever held. Four hundred and thirty-three contestants flew their models continuously over a period of three days in competition for two hundred and fifty prizes which were given to the winners. The affair was staged at Detroit, Michigan, under the sanction of the National Aeronautic Association and sponsored by the "Detroit Times." Mr. Walesby, aviation editor of this publication, was the contest director.

The pleasure of the boys and the great success of the contest was made possible by the able delegation of assistants who took charge of their duties with the technique of veterans. The smoothness with which the contest progressed was due largely to the long experience of the officials in affairs of this kind. A complete delegation from Akron, Ohio; outstanding among whom were Mr. Jellison, Mrs. Dugan, Mrs. Alexander and Mrs. Harrington, contributed especially to the success of the contest. Lt. H. W. Alden, chairman of the National Aeronautic Association Contest Committee, attended to the many details which seem to persist at such events. Among other people who aid was invaluable were Capt. Willis C. Brown, Mr. Ernest Walen of Springfield, Mass.; Mr. Robert K. Allen, director of the Pittsburgh unit of the I.G.M.A.A.; Mr. Bertram Pond, who won the Moffett Contest for New Zealand, and many other prominent persons in the model airplane field. Mr. Grant represented MODEL AIRPLANE NEWS at the contest. We wish to extend much gratitude to Mr. C. L. Bristol who was the official photographer for MODEL AIRPLANE NEWS and who is responsible for the pictures which appear on these pages.



Here's a gas job not worried about runways, taking off the grass

Michael Roll with the pee-wee engine he has made for gas jobs. The engine is about 2 in. high and beautifully made

T. Petrides and his 300 sq. in. gas powered "Stout" entry

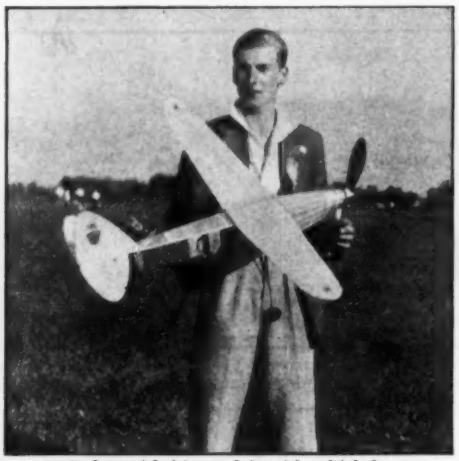
The headquarters of the contest was the Hotel Book-Cadillac. Here a special room was set aside for registration and transacting the business attendant to the successful operation of the contest. A workroom was also afforded the contestants who took possession of the hotel "en masse." Through the courtesy of the "Detroit Times" special hotel rates were given the contestants, which particularly enlarged their scope of action financially while in Detroit.

The outdoor events were held for three days at the Wayne County Airport, located twenty-three miles southwest of Detroit. This is a beautiful specimen of an airport, the field being very level and extending free of obstructions for nearly a mile. The surrounding country was more or less flat, with few obstructions, so that machines flying outside the bounds of the field had a good chance of "coming through alive."

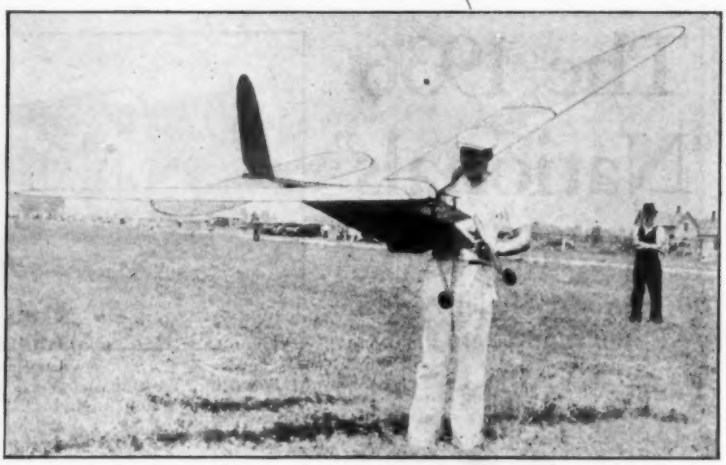
The indoor events were held on the last day, July 2nd, at the Olympia Auditorium. The picture presented here was similar to other indoor contests. The times were excellent considering the fact that the ceiling was fairly low and that lights obstructed

Charles Tracy, Junior aviation editor of the "Toledo News-Bee," launches his Stout Contest entry

Bert Pond launches the model of Vernon Gray, New Zealand, on the winning flight in the Moffett Contest



A. A. Judge with his model, with which he captured the Wakefield Trophy for England.



Vernon Boehle plays "anchor" to his 14 foot, 8 in. span gas job

A crash caused by improper launching. The owner *pushed* the model on the take off. It took off several things

Herbert Greenberg weighs in his gas job while Boehle waits with his giant soarer

the flying arena.

A wide program of sight-seeing trips and activities was provided the contestants. Trips to the Ford plant and other places of interest were enjoyed by all. The banquet held the night after the contest will be remembered by all. There were just two vacant chairs out of five hundred seats in the Masonic Temple Ballroom. Here interesting remarks of many prominent speakers were enjoyed. Mr. Stout was the chairman. Two hundred and fifty prizes were given out to the winners by Lt. H. W. Alden. These were received with the greatest exuberance. Outstanding applause was given Carl Goldberg, who as usual placed among the winners.

The outstanding feature of the contest this year was the presence of the British team, contenders for the Wakefield Trophy. The team was composed of the following gentlemen:

B. K. Johnson, 58 Norton Road, Wembley, London; J. C. Smith, 1 Green Avenue, Barnes, S.W.; A. A. Judge, 10 The Polygon, Old Town Clapham, S.W., London; R. Copland, 27 Chalcot Crescent, Regents Park, London, N.W. 1; D. Fairlie, 6 Wembley Park Drive, Wembley, Middlesex; A. Greenhalgh, 88 Ashworth Lane, Bolten; J. B. Allman, Khelona Manor Road, Dorridge, Birmingham. This delegation was in charge of Mr. B. K. Johnson. Contest activities for this group started several days before the contest in Detroit began. They were greeted at the pier by a representative committee of model enthusiasts and National Aeronautic Association officials. A dinner was given to them at the Midston House immediately afterward. From that time on, their stay in New York until they departed for Detroit on Sunday, June 28th, was one round of sight-seeing and entertainment. With this British delegation was Mr. Andre Vincre of 10 Rue Bellevue, Suresnes, Paris, France, a model builder from France who represented his country in the Wakefield Trophy Contest.

The outstanding results of the contest was the "lifting" of the Wakefield Trophy by the English team and the winning of the Moffett Trophy by Vernon B. Gray of New Zealand. Gray's model was flown by Mr. Bertram Pond who was the proxy flier. Without question these two events created more interest because of their international aspect, than any others. The sportsmanship and spirit of the contest was unsurpassed. Not one unpleasant incident arose, to our knowledge, to mar the pleasure of any of the contestants.

The fact that the contest was international in character caused the attention of many prominent officials in aviation circles to be drawn to it. It had a far reaching effect and we believe it has done more to promote model aviation

The Akron delegation, on the right is Mrs. Alexander of the Women's Chapter of the N. A. A. Mrs. Dugan, pres., is on the left

Dick Everett of the I. G. M. A. A. Unit No. 3 from Pittsburgh launches a New Zealand model

Quite a group. Vernon Boehl (center) prepares for flight; Ira Hassatt of Cal. (left center) also busy, and Bill Atwood and Charles Grant discuss gas model problems. Do you know the others?

The British team that took home the Wakefield Trophy. Left to right, upper row: D. Fairlie, R. Copland, B. K. Johnson, J. C. Smith and the British press representative. Lower row: H. A. Jones, A. Greenhalgh, J. B. Allman, A. A. Judge

than any one thing that has ever happened. Model flying in the past has lacked the help of older people interested in aviation. Many of them have felt that model flying was "child's play." This contest awakened them suddenly to the fact that it was training the youth of the country not only in aviation, but in every personal quality which contributes to a successful life; sportsmanship and ingenuity being two of these outstanding virtues. Model building and flying today, as model builders know but as many older people do not, is training young men in all phases of aviation, in the principles of flight as well as in the construction of planes. This is invaluable to the country.

The greatest advancement and variety shown in the design of models was in the gas model field. In this event there were about 190 contestants who displayed every possible type of design of airplane that one could think of. The parasol type predominated, however.

One of the outstanding gas jobs was the one entered by Vernon Boehle of Indianapolis, Indiana. Though he did not win the contest, without question, his model's capacity for duration is unlimited and unquestioned. It has a span of fourteen feet, eight inches, with a high lift airfoil and powered with a Baby Cyclone engine. It was obvious to many that once this ship found a thermal current that any length of flight might result. It flew at approximately six miles per hour. Consequently, the sinking speed was low. Because of its enormous wing area, the slowest up-draft was helpful. The gas model contest was won by Francis J. Tlush of Lyndhurst, New Jersey.

The Wakefield contest was won by Albert A. Judge, Great Britain, whose three flights averaged up to just seven seconds more than the next best contestant, Roy Wriston of the United States. Judge had a beautiful model and we personally attribute his success to the fine design and to his excellent judgment. It is interesting to note that the tail surfaces were fairly large but not extremely large, as in the case of many persons who had models. Judge has evidently found the happy medium which is most efficient.

The winner of the Moffett International Contest was Vernon B. Gray of New Zealand, proxied by Bertram Pond. The event was another one of the big sensations of the contest. Through this incident, the scope of model aviation goes half-way around the world. New Zealanders have been excellent model builders for some time, but this feat joins them with the international group who are building this wonderful sport.

Due to limited space in this issue, further highlights will be published next month.

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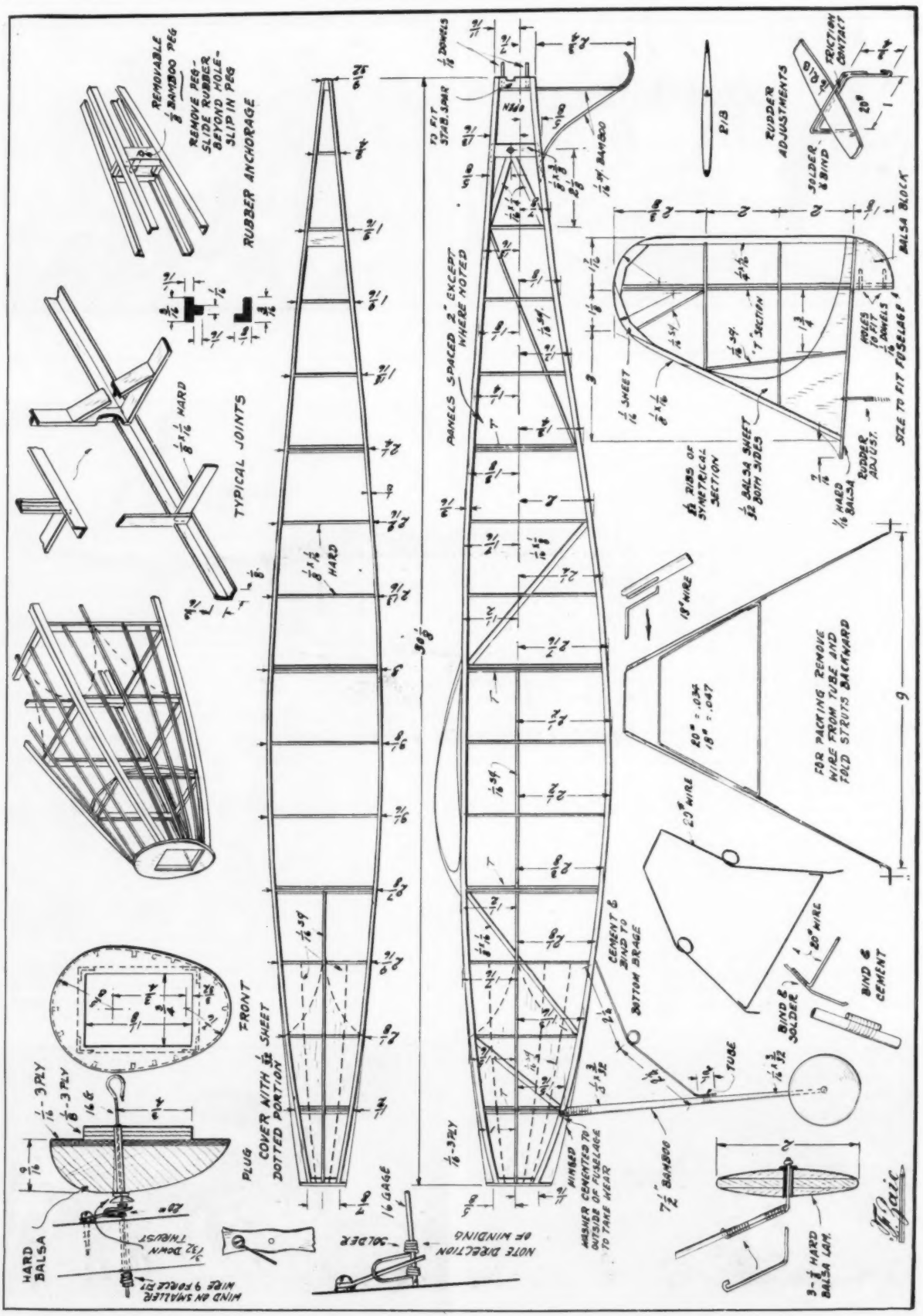
Melvin Yates of Illinois with his KG which placed second in the Open Class Gas Contest

Mr. R. K. Allen (left), Penn. director of the I. G. M. A. A., talks it over with Mr. Chas. Grant, director, while one of the leaders in Texas model aviation, acts as referee

Bert Pond congratulates Fred Tutsworth of Huntington, Ind., on his fine Bellanca scale gas job

Kenneth Woodward of Buffalo, N.Y., and his biplane gas job, which he flew in the Texaco Contest


REMOVABLE 3/8" BAMBOO PEG
REMOVE PEG—SLIDE RUBBER BEYOND HOLE—SLIP IN PEG
RUBBER ANCHORAGE
TYPICAL JOINTS
HARD
PANELS SPACED 2" EXCEPT WHERE NOTED
TO FIT STAB. SAW
1/16 DOWELS
1/16" SQ. BAMBOO
RUDDER ADJUSTMENTS
FRICTION CONTACT
SOLDER & BIND
BALSA BLOCK
HOLES TO FIT 1/16 DOWELS
SIZE TO FIT FUSELAGE
1/16 SHEET
1/16 SQ. "T" SECTION
1/16 RIBS OF SYMETRICAL SECTION
1/16 BALSA SHEET BOTH SIDES
1/16 HARD BALSA
RUBBER ADJUST.
18" WIRE
20" = .036
18" = .047
FOR PACKING REMOVE WIRE FROM TUBE AND FOLD STRUTS BACKWARD
20" WIRE
CEMENT & BIND TO BOTTOM BRACE
BIND & SOLDER
BIND & CEMENT
TUBE
7 1/2" BAMBOO
3-1/16 HARD BALSA LAM.
PLUG
COVER WITH 1/32 SHEET
DOTTED PORTION
FRONT
1/16-3 PLY
1/8-3 PLY
16 GA.
HARD BALSA
WIND ON SMALLER WIRE 9 FORCE FIT
1/2 DOWN THRUST
1/16 GAGE
SOLDER
NOTE DIRECTION OF WINDING
WINDER CEMENTED TO OUTSIDE OF FUSELAGE TO TAKE WEAR

How to Build the Wakefield Mayfly II

The Story of How One of the Finest of Contest Models Was Developed by an Expert British Builder—and How You Can Build It

By C. S. RUSHBROOKE

Drawings by Frank Zaic

The Mayfly II and its designer, C. S. Rushbrooke

IN PRESENTING this model to the great American public of aero-modellers, I do so in a spirit of trepidation that my views may be taken as being representative of general English practice—with the possible result that I will be "hounded" by the large number of British enthusiasts whose ideas differ from mine. However, I am consoled with the knowledge that the machine here described has at any rate justified the time and thought given it, subsequent experiences and successes having been very gratifying to myself.

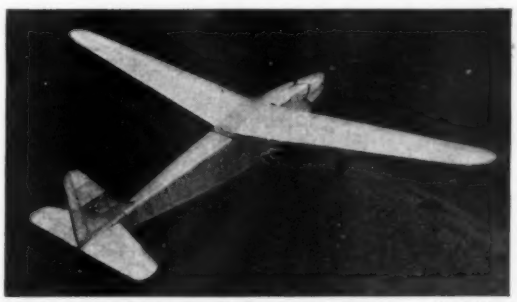
Whilst durations have been quite up to scratch, the general handling, strength and stability features that became apparent under severe tests were such that much satisfaction was felt, considering the fact that the machine was designed purely for duration purposes.

Actually this machine is a development of the job sent to St. Louis last year for the Moffett Trophy contest, gaining 8th place. Much was learned from the first model, and subsequent modifications are the result of experiences gained with this machine—the "Mayfly I".

The original wing section of "Modified Clark Y" has been substituted with "R.A.F. 32", this section being found to give better soaring, and a much slower flying speed. Also the wing area has been increased from 198 to 206 sq. in. This was done to take full advantage of the greater area allowed in the Wakefield rules—the second machine being built for this contest.

In setting out to design this machine, various factors and previous experiences were taken into consideration; the main point kept in mind being the sad experience in the 1934 Wakefield contest at Warwick. It is past history that the competition was held under vile weather conditions—and my model built for that year being of fairly light and "fair-weather" construction, went all to "pot" owing to the thorough soaking it received. Being a single motor job, the fuselage twisted under the rubber torque, with a consequent upsetting of flying trim.

Bearing this experience in mind, I decided to build the present machine with a degree of sturdiness and inherent stability to take care of adverse weather conditions, even at the sacrifice of a certain amount of the ultimate duration. The model on test showed all the points aimed for to a marked degree, and the durations obtained in subsequent contests etc., have been extremely satisfactory. Average duration is around the two minute mark under fair conditions, and the ability to soar has been proved on numerous occasions—the best flight to date being just over five minutes. The most pleasing feature to me has been its ability to buck the elements in no uncertain manner, and under English conditions—where on the arrival of a really fine flying day one is almost too staggered to take advantage of it—this attribute has enabled it to more than hold its own, as the records gained go to show. Successes have been numerous in our local contests and on two recent occasions where visits have been paid to neighboring clubs, I have managed to bag the chief duration contests held. I hope to enter this machine in various National competitions during the coming season, and feel confident that I shall at least not disgrace myself!!



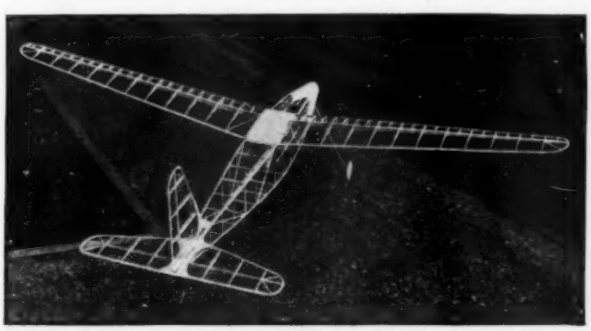
The completed plane radiates flight efficiency and ability to soar in spite of its rugged construction

The construction details will perhaps strike the majority of American builders as on the hefty side, but I would make it clear at the outset that for one thing, I wished to obviate any recurrence of the warping tendency, and to produce a model that would stand a prolonged session of hard flying, being unable to devote the time I should like to bringing out more than a very few models a year.

Extensive use is made of sectional materials and the strength gained by this practise is something to be experienced to realize—in fact the uncovered fuselage was strong enough to take the torque of the rubber motor without any appreciable amount of "give." Should anyone think I erred in making the skeleton work too strong in this direction, I should note here that it was intended to make experiments with twin motors and gears, hence the ruggedness used to take care of compression strains.

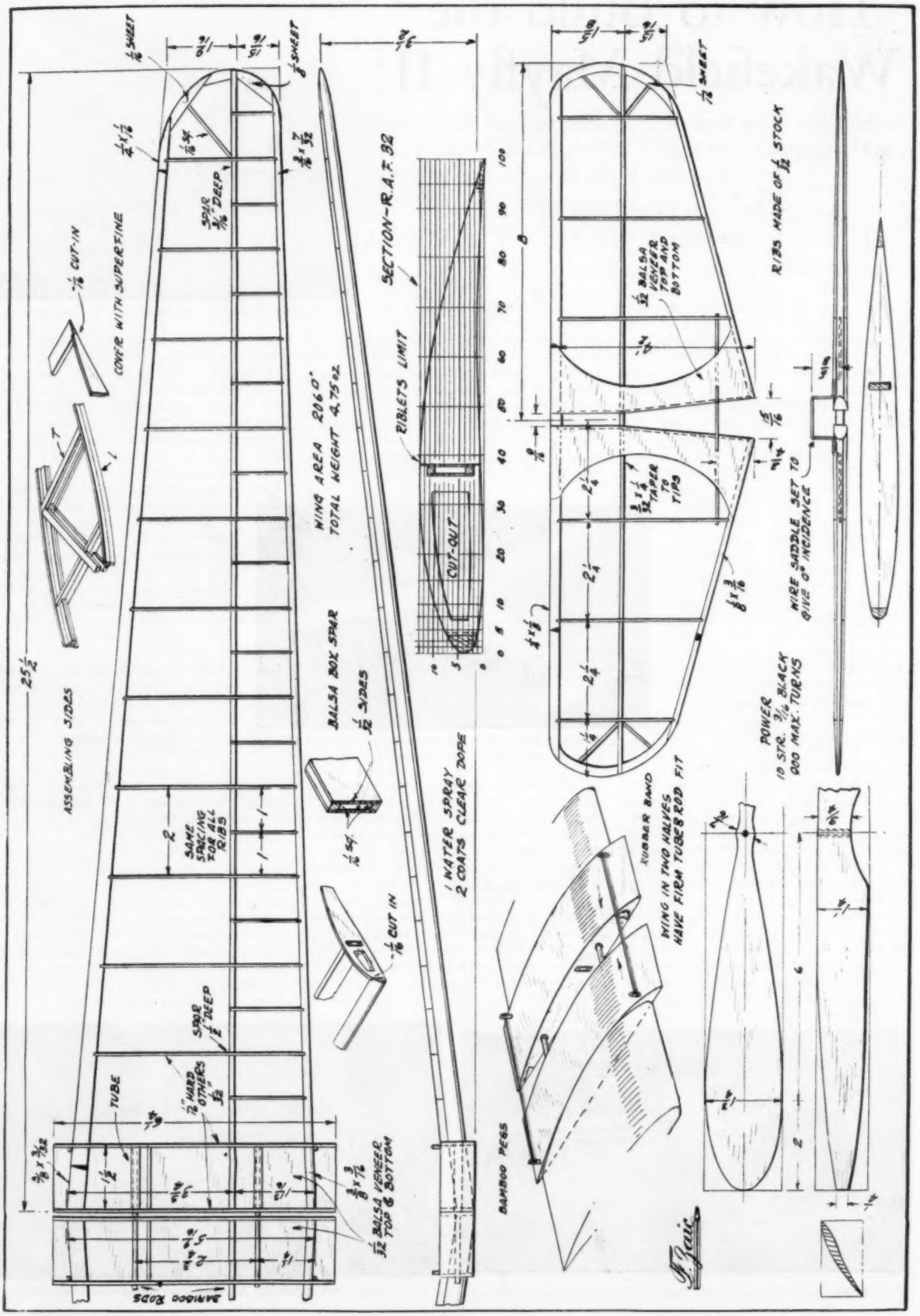
The propeller used will be strange to American eyes, and I will most likely be accused of using too fine a pitch and too scanty blade area. Whilst not perhaps

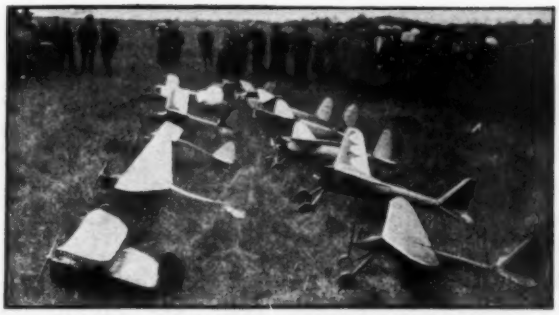
(Continued on page 32)



The monospar and half ribs make a strong efficient wing

Note the carefully detailed and rigid construction


ASSEMBLING SIDES
CONFR WITH SUPERFINE
SPAR 1/16" DEEP
SAME SPACING FOR ALL RIBS
SPAR 1/8" DEEP
TUBE
BAMBOO RODS
BALSA BOX SPAR
SECTION-R.A.F. 82
RIBLETS LIMIT
CUT-OUT
WING AREA 206 O"
TOTAL WEIGHT 4.75 oz
1 WATER SPRAY
2 COATS CLEAR DOPE
BAMBOO PEGS
RUBBER BAND
WING IN TWO HALVES
HAVE FIRM TUBE & ROD FIT
1/2 BALSA VENEER TOP AND BOTTOM
TAPER TO TIPS
RIBS MADE OF 1/32 STOCK
WIRE SADDLE SET TO GIVE 0° INCIDENCE
POWER
10 STR. 3/16 BLACK
900 MAX. TURNS



Pict. No. 10. Gas jobs at a contest, in France

Pict. No. 1. This is not a new breed of dog, though its name is "Tubby." It is a swell flying job by Elbert Weathers

"Gas Lines"

What I.G.M.A.A. Members Are Doing Throughout the World—Gas Models of Members May Be Registered—Big Contest Soon

WE ARE pleased to report this month that the I.G.M.A.A. membership has increased, nearing the one thousand membership mark. New units of at least eight members in each have been formed. News of their activities will be published from time to time. Members and directors may honestly feel proud of the job accomplished in only seven months. This column "Gas Lines" is devoted to members of the I.G.M.A.A. and we urge unit secretaries and members to write often so that all members may benefit by the immediate release of information that may help them in design, construction and flying of their gas "jobs." Now for the pictures submitted by members this month.

Picture No. 1 is a well designed and beautifully constructed model appropriately named "Tubby" by Elbert Weathers of 2720 Poinsettia Dr. San Diego, California. He writes, "I have used the Elf engine and it is completely cowled, as you will note. The plane flies slow but sure, having a steep, slow climb on the take-off. The design allows three point landings consistently and the glide is very flat." The wing span on this model is 4 ft. 4½", overall length is 3 ft. and the weight ready to fly is 28 oz. Weathers writes us that they are organizing southern California into a unit and that they would like to see the duration trophy. Hold tight to the trophy Maxwell Bassett, Weathers sounds quite serious.

Picture No. 2 of a well built "Buc-

(Continued on page 38)

Pict. No. 2. Here is a fine flying "Buccaneer" by G. A. Sheill

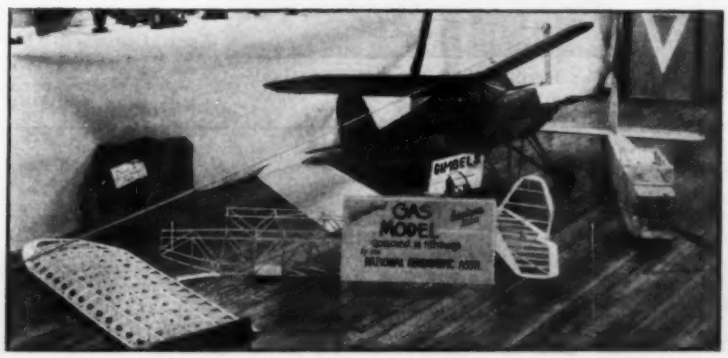
Pict. No. 3. Gas motors allow adherence to scale. A Boeing F4B-4 by Edward Kershaw

Pict. No. 8. A KG model built by the South River, N. J. I.G.M.A.A. Unit

Pict. No. 4. A model Mr. Mulligan powered with a miniature gas motor, by Bob Johnston

Pict. No. 9. Mr. Van Wymersch of Belgium is an I.G.M.A.A. member. Here is his latest gas job in the making

Pict. No. 5. Paul Zakim's "Cavalier" in full flight



Pict. No. 6. A gas model display by Mr. R. K. Allen's Pittsburgh Unit at the annual Hobby Show at East Liberty. Mrs. Allen built the plane in the picture

Pict. No. 7. An unusual model built around an "Elf" engine, by Lowrie McCarty

Frontiers of Aviation

The Latest Developments in Planes That Are Flying the Air Ways Throughout the World—How to Build the Aeroneer B-1

The new Pasped Skylark. High speed 139 m.p.h., landing speed, 35 m.p.h.

By ROBERT MORRISON

NEXT month the world's premier air classic, the National Air Races, take place. This time the great air show will be staged at Los Angeles, California, September 4-7. Many new planes are expected to make their appearance. Pilots and designers are working hard on the new swift racers to get them built in time to be on the starting line the opening day. Much secrecy prevails concerning the development of these planes which are scattered in all parts of the country. However, here is the dope as MODEL AIRPLANE NEWS has been able to gather it. We cannot guarantee that all of it is 100 per cent correct because of the prevailing secrecy, but it will give you an excellent idea of what to expect in the way of new planes at this year's races.

The Meyer X (125 hp. Warner engine). No Dept. of Comm. card in cockpit (Yeager)

The Porterfield 35-70 low priced sportplane with a Le Blond 70 hp. (Davcuk)

Ray Wittman, a constant money winner and officially rated as America's second leading race pilot for 1935 has revamped his small "Oshkosh Chief." A smaller engine has been installed to make it eligible for the 266 cubic inch displacement races. It was formerly in the 375 cubic inch class.

The Menasco engine recently bought by Wittman will be installed in a rebuilt Kieth-Rider racer, the famous "Bumble Bee" of several years ago. The plane should be as fast as any other racer in its class this year. It should put up a good race with its sister ship, Mr. Kling's Kieth-Rider. The ship will be entered in the new 397 displacement class.

In the past races, Wittman's many racing planes have not been the fastest around the pylons, but they have been the most dependable. While the faster ships were suffering from bad cases of engine trouble, Wittman plugged along at a steady pace always to place "in the money." Ray Wittman should be one of the outstanding race pilots at the bigger and better 1936 National Air Races.

Harold Neuman, biggest money winner last year and America's foremost race pilot, will again be a serious threat this year. He has put his low-wing Fordon-Neuman and Howard "Ike" racers up for sale and has built a new faster Menasco powered job for competition this year. There are some new noteworthy features about this plane that have not been disclosed. We shall have to wait until the races to find out about them.

N. F. Scudder's new racer is said to be very radical in design, but like the Neuman job, its features are still the secret property of Mr. Scudder.

The new Waco 1936 model in the seven thousand dollar class

The Herrick Vertiplane. The upper wing revolves when taking off (Davcuk)

Another racer that has a possibility of making an appearance is a low-wing monoplane designed and built by the late Lawrence Jamieson. It is powered by a Curtiss D-12 engine of 600 hp. and has a retractable landing gear. The span is 22 feet; length, 21 feet. Construction is of steel tubing with three-ply spruce cover-

The Soviet plane that made an altitude record of 11,000 meters (Sovfoto)

Here's a new "job", the Stewart M-2 with two Wright J-6 engines of 330 hp. each (Yeager)

The Gypsy Monospar, a popular English sportplane

The new Northrop A-17A U. S. Army high speed attack plane with a 650 Twin Wasp (G. Williams)

ing. It bears the likeness of Ray Wittman's D-12 powered low-wing which placed second in the 1935 Thompson Trophy Race. The plane has a performance that should qualify it for the Bendix and Thompson races.

Beside Kling's, Wittman's and Earl Ortman's Kieth-Riders, two more new Kieth-Riders are expected this year. Both will undoubtedly be powered by Menasco engines, one for the 375 cubic inch displacement class, the other for the 550 class. They will probably be of the same general design as the former sleek Menasco powered Kieth-Riders.

Two extremes, a 1,000 hp. Cyclone and a 1/5 hp. Cyclone held by its mascot

Minister of the Japanese Navy, Asami Nagana, inspects students at the International Airport, Tokyo

The Franklin Sportplane model No. 99 with a 90 hp. Lambert engine (Davcuk)

Art Chester will be on hand with his famous little mid-wing racer to once more fight it out with Lee Miles' Miles-Atwood racer for biggest prize money. His new racing craft which he has just designed will not be ready until the 1937 races. Art has been thinking of putting a Miller V-8 engine in the ship which will make it eligible for the classes above 500 cu. in. displacement.

In Troy, Ohio, someone is said to be building a low-wing speed job powered by a Menasco. Raymond Bittner of Chicago is expected to appear with a racer for the 266 cu. in. class. Its power plant will be a Le Blond engine.

Riley Burrows' small low-wing racer is all set for the races. It is powered by a 120 hp. Glenn L. Martin in-line engine that should make it a very fast plane. Riley claims that his plane has a landing speed as low as 40 m.p.h. with flaps down in spite of its high top speed!

As related in past issues, Joe Jacobson will have a new racer on hand and the "Delgado Maid" is also expected to take part in the races after undergoing many improvements during the past year.

Thus are some of the new racing planes that will participate in the various racing events at Los Angeles. There will probably also be others plus many of the racing planes of other years that have made the National Air Races what they are today. Foremost among these is Marion McKeen's "Miss Los Angeles."

The greatest development of the racing plane this year will be solely confined to the very small ships. There appears to be nothing new in the way of the larger Bendix and Thompson racers for this year. It had been rumored that Howard Hughes may enter the Bendix and Thompson races with his record-breaking racing plane, but this is very improbable as the plane has been completely revamped into an Army pursuit ship and will go to Dayton for tests. Whether it will still do 350 m.p.h. is not known, but it is very probable that it will, and what other country has a pursuit under design or construction that has that speed?

As in past years the Menasco engine seems to be the predominant power plant for the forthcoming races. This year this new 250 hp. job will be out to prove its performance.

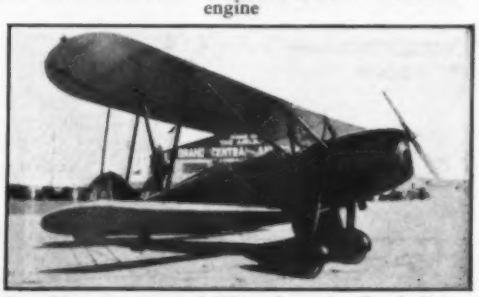
Surprising is the fact that Northrop's name did not appear on the list of bidders for the Army Air Corps pursuit plane contract opened April 15. Four companies, Curtiss, Seversky, Vought and Consolidated now have single-place pursuit ships at Dayton undergoing tests. Curtiss was low bidder on the contract, $29,412 each in lots of 25 and in lots of 200, $14,150 each. To give you an idea in the range of prices for pursuit planes for our Army are the following prices. Chance Vought, who was a surprise bidder having formerly devoted all of its time to the development of Navy scouting planes, bid $34,148 each for 25, $16,051 each for 200—Seversky $34,900 each for 25, $15,800 each for 200—and Consolidated $44,000 each for 25, $24,260 each for 200. Price, performance and maintenance are the three main factors which decide who will get the contract.

Unfortunately Consolidated's pursuit cracked up during tests at Dayton, killing the Army's chief pilot McClellan. The ship was said to be a revamped version of Consolidated's two-place pursuit now used extensively by the U. S. Army Air Corps. It was a single-seater.

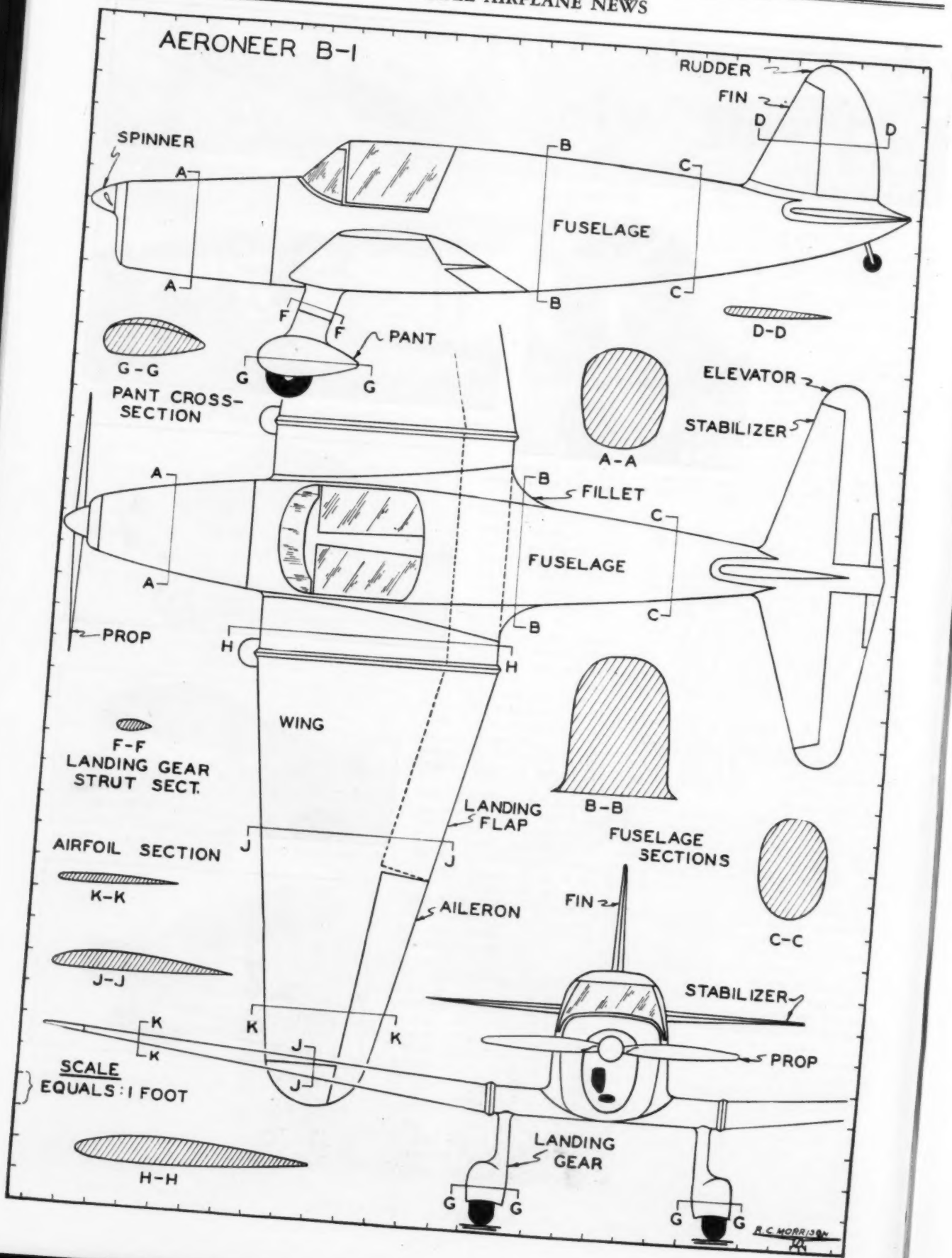
On September 4 more bids will be opened

(Continued on page 36)

The latest model of the Taylor Cub with a Continental engine



The Menasco powered Waco flown by Frank Kurtz on many record flights


AERONEER B-1
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EQUALS: 1 FOOT
LANDING
GEAR
H-H
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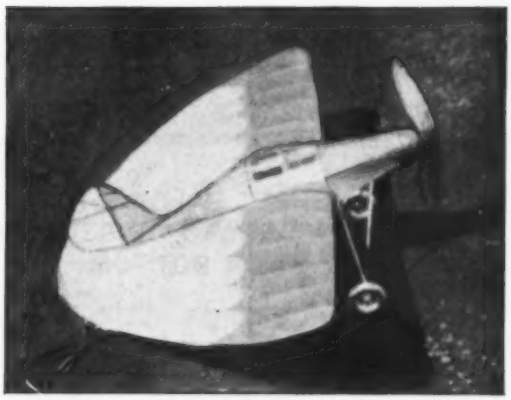
G
R.C. MORRISON

Building the Arup Flying Wing

If You Wish to Build and Fly One of the Most Unusual Models Ever Designed, Try This One on Your Work Bench. It Is a Remarkable Flier

By GORDON ENGLEHART



The finished plane. Probably contrary to your opinion, it is very stable in flight

THE Arup Flying Wing is one of the many lightplanes which have been produced recently as a try at the goal of the "flivver plane" or a plane which the common man would be able to buy and fly. The Arup is perhaps the nearest approach yet to this ideal. It is light, yet strong, low-powered, still quite fast, has a low landing speed and is very economical to run. The original was powered with a 40 hp. Continental engine, had a top speed of 97 m.p.h. and landed at only 23 m.p.h. There was practically no attempt made at streamlining (as is usually the case with experimental models) so that the top speed could have been raised well above the 100 m.p.h. mark if resistance had been cut down.

So much for the background. The model presented here is an excellent flier and is very sturdy. These models never seem to crack up; they merely disintegrate from old age and abuse. If you take time and work carefully, you will have a flying model you can well be proud of.

One more thing before beginning the instructions. Many beginners have gotten so accustomed to having everything done for them in the way of completeness in plans and instructions, that they have left their sense of initiative and inventiveness, far behind. That is unfortunate because model building is supposed to develop new thoughts and ideas so that if everything is practically done for the builder, all benefit is lost. For this reason, several small details have been left out of the plans but not out of the instructions. All these parts may be made very easily by studying the instructions carefully; and it is hoped that this will set our embryo model builders to work at their own problems instead of merely copying the results of somebody else's labor. Now that I've had my say, let's get down to work.

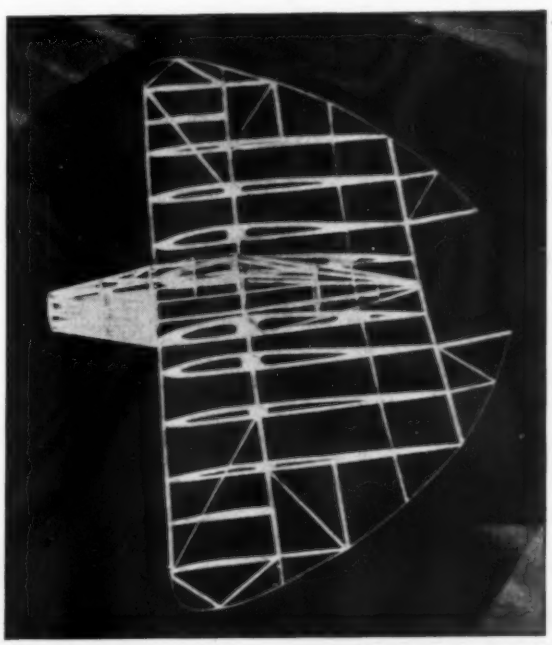
Wing Frame

The wing is made first because it is the foundation of the plane. The body is built directly on the completed frame, so there is no other place to start. Start by cutting out two of each rib section of 1/16" sheet balsa. They are hollowed out as shown on the plans to lighten them. Now take two pieces of hard 1/8" sq. balsa and mark the positions of the ribs with a pencil. The pieces should be about 26" long so that you will have a little extra. The distances for the rib spacings will be found on the assembly drawing. The two No. 1 ribs are 3" apart; the No. 2 ribs are 1¾" from the No. 1 ribs; No. 3 ribs are 2½" from No. 2; No. 4 ribs are 2½" from No. 3 and No. 5 ribs are 3½" from No. 4 ribs.

Fit the slots of the ribs into the upper wing beam at the proper places and true them up. Then crack the beam so that there is 3/8" dihedral on each side starting from the No. 1 ribs. Now put the lower beam into place, cracking it where it fits into the No. 1 ribs. Cement all joints securely and true the frame up. Next the rear spar is put in. This is a piece of hard balsa 1/8 x 1/16". After that, the trailing edge is put on. This is a piece of hard balsa 1/8" x 1/16". Pin it onto place while the glue is drying and check over the model to see that everything is still lined up perfectly. Now put the leading edge on. This is a piece of the hardest 1/8" x 1/16" you can get.

Now go over the frame carefully and glue any joints which are not solid. Now the wing-tips are bent from 1/16" sq. bamboo. Although no full-size outline is shown on the plan, the shape can quickly and accurately be gotten from the assembly drawing. Bend the tips over a candle flame to fit the wing frame. The wing tip extends from the leading edge to the rear edge of rib No. 5 and then to the trailing edge.

Next, the trimmer flaps are made. They are made in the usual way of making tail surfaces, by pinning the work directly to the plan. When done, they are cemented to the trailing edge so that the trailing edge shows a gradually rounded surface. Now, go over the completed wing framework with sandpaper and you are then ready to start the fuselage.



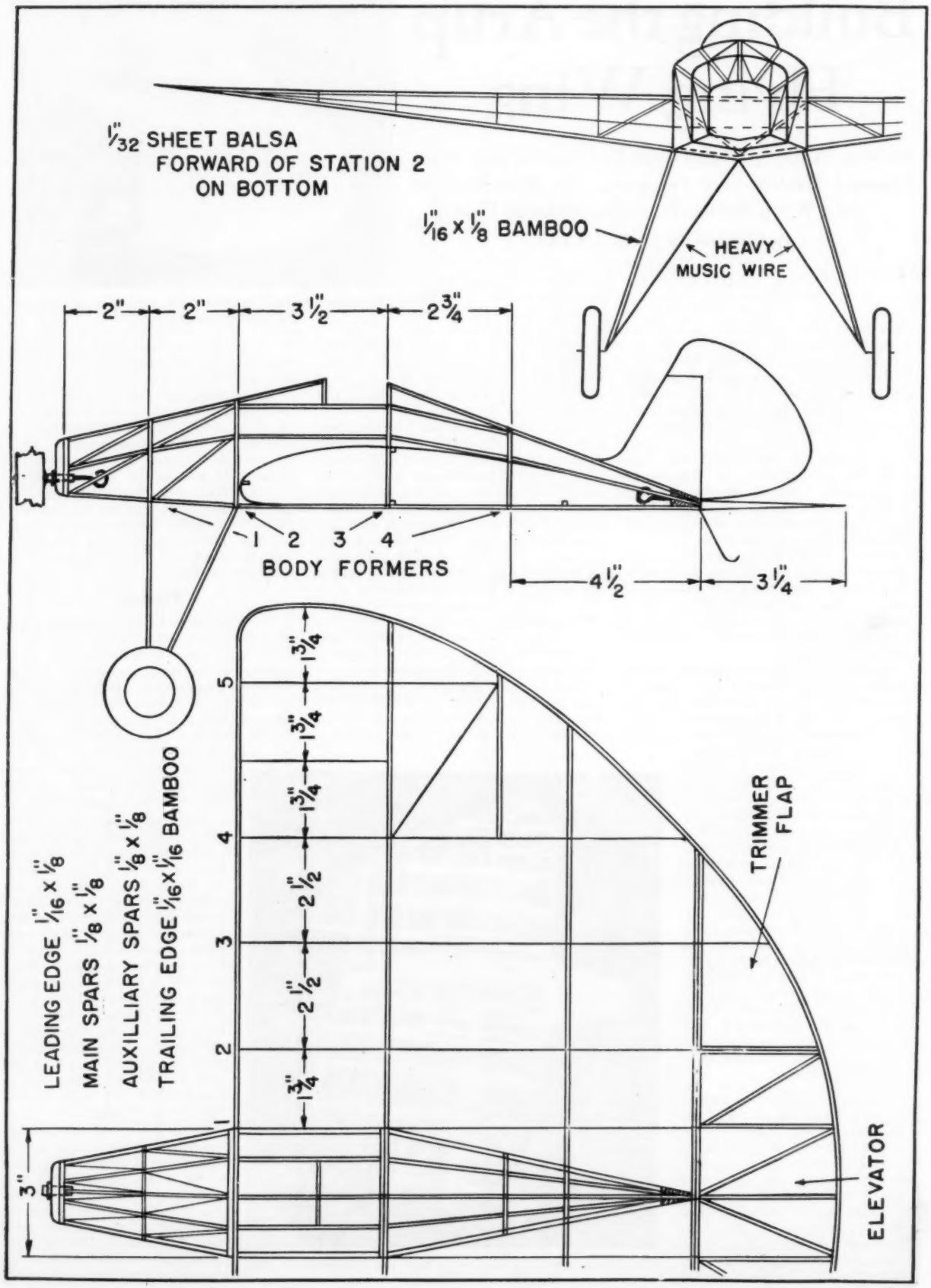
This gives you some idea as to how the framework is put together. It is light for its area

Fuselage

The fuselage is started by cutting out 1 of each former of 1/16" hard sheet balsa. Now take formers 2 and 3. Former No. 3 is glued to the main wing beams so that the bottom notches are just below the bottom of the ribs. Former No. 2 is glued in a line with station No. 3, and the line formed by the bottom of the ribs, to the leading edge. Let these formers dry well for they are the foundation of the body and they must be accurate if the body is to be accurate.

Next, take four 18" strips of 1/8" x 1/16" hard balsa and with a pencil, mark with a pencil where formers No. 1, 2, 3 go. Cement all these pieces into the side notches in formers 2 and 3 at the pencil marks and let them dry. When they are dry, crack each piece at former No. 2 and bend them in. Now, take former No. 1 and put it in where the pencil marks are. Cement it securely and line it up accurately before the cement dries. The rear hook is put in now. It is a piece of stiff music wire bent into a hook and cemented to the trailing edge in the middle of the space between the two No. 1 ribs.

Next, the four stringers are cracked at station 3 and bent in and cemented to the trailing edge at the middle. Former No. 4 is now slid into place back of station No. 3 and cemented. Now the rest of the stringers are cemented into place. Pieces of 1/8" x 1/16" balsa are cemented midway between formers 1 and 2 and parallel


1/32 SHEET BALSA
FORWARD OF STATION 2
ON BOTTOM
1/16 x 1/8 BAMBOO
HEAVY
MUSIC WIRE
2"
2"
3 1/2"
2 3/4"
1 2 3 4
BODY FORMERS
4 1/2"
3 1/4"
LEADING EDGE 1/16 x 1/8
MAIN SPARS 1/8 x 1/8
AUXILLIARY SPARS 1/8 x 1/8
TRAILING EDGE 1/16 x 1/16 BAMBOO
1
2
3
4
5
3"
1 3/4"
2 1/2"
TRIMMER
FLAP
ELEVATOR

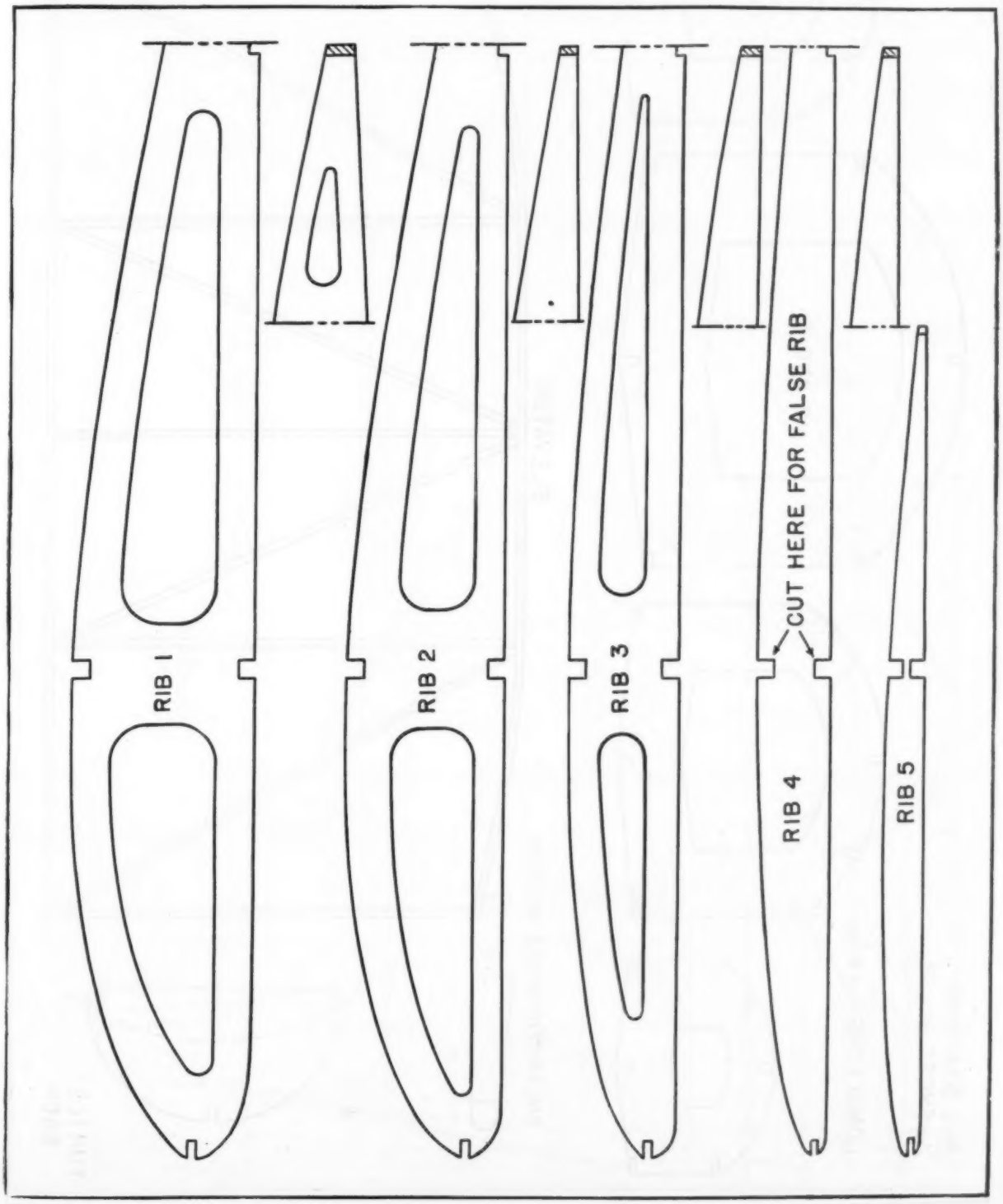
to them. When they are dry, diagonals of the same size are put in as shown on the assembly drawing. The bottom of the space between formers 1 and 2 is covered with sheet balsa 1/16" thick.

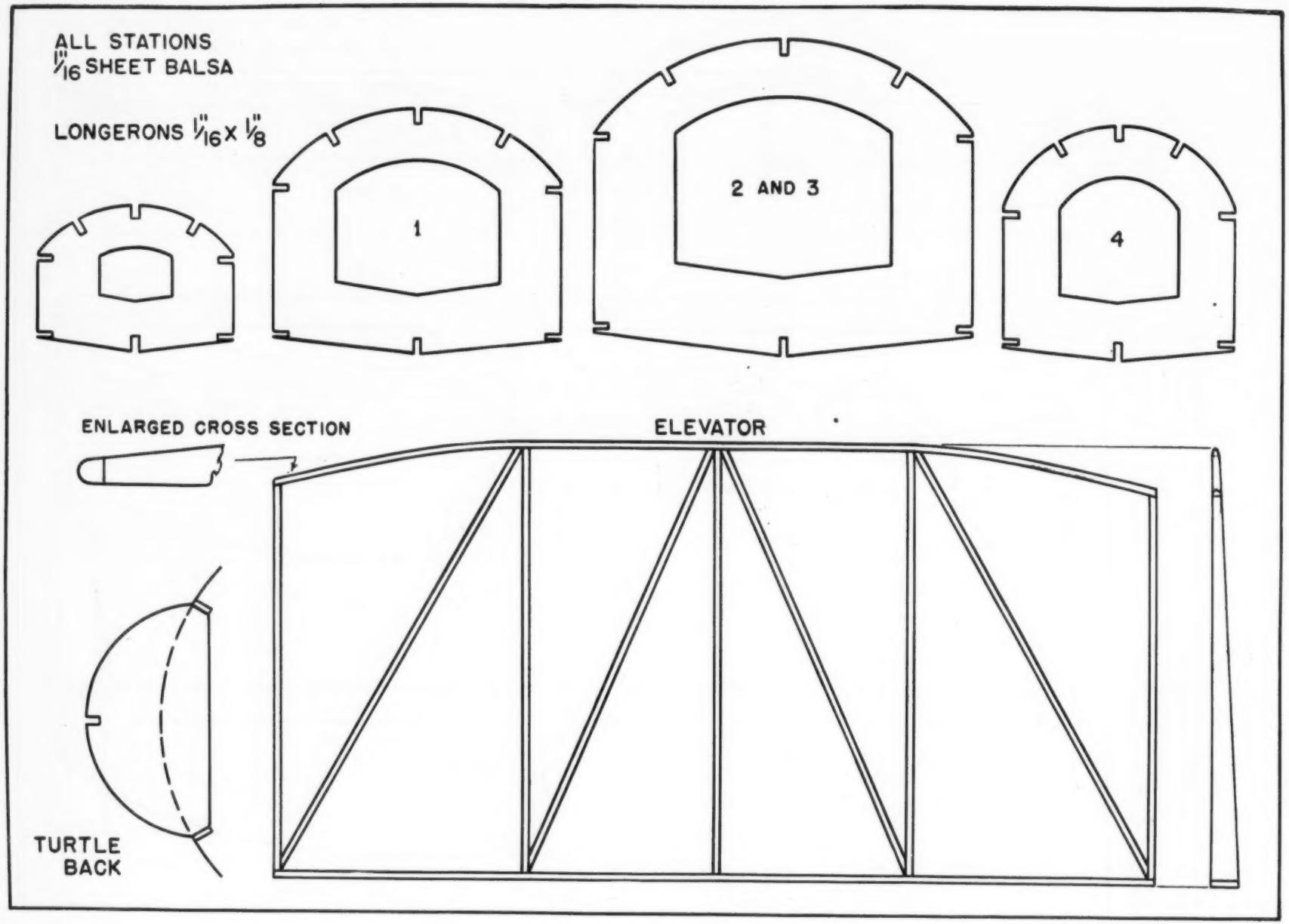
Next, the turtlebacks are cut out and cemented on. They are of 1/16" sheet balsa. The front turtleback is cemented half-way between formers 2 and 3; the rear one is cemented to the front of former No. 3. Balsa stringers are run from the rear turtleback to former No. 4. Thin strips of bamboo are run from the rear turtleback to the front one, cracked, and cemented to former No. 2.

A space should be left open at the bottom at the rear so that the rubber may be changed easily. This is done by putting a spreader bar across the two bottom stringers at the rear and leaving this space uncovered. Now, go over the whole body with sandpaper and then the body is finished.

Tail Surfaces

The tail surfaces are made in the usual way of 1/16" sq. bamboo and 1/8" x 1/16" balsa. Work right on the plans. When they are done, sandpaper them carefully and then go over all the joints to make certain that they are securely glued.




ALL STATIONS
1/16 SHEET BALSA
LONGERONS 1/16 X 1/8
1
2 AND 3
4
ENLARGED CROSS SECTION
ELEVATOR
TURTLE BACK

Finishing Up

This is a section not found in most articles, but here it is necessary. Go over your model and see where it needs extra bracing. It will need some at the wing tips and along the trailing edge. The details of the bracing I used may be found by looking at the framework picture. After you have put in all necessary bracing, sand the joints, and you are then ready for covering.

Covering

I can say very little about the details of covering. You should work carefully and use small pieces on the body and large pieces on the wings. The cockpit should first be covered with cellophane, then the body, wings and tail surfaces with Jap tissue. Many interesting color schemes can be worked out for this model. I used white with blue scallops on mine and found it to be very effective. However, color scheme is purely a matter of personal taste.

After you have finished covering the model, first spray it with water and then give it two coats of a good grade of dope.

Now glue on the stabilizer and rudder. The stabilizer may be either cemented on or hinged with copper wire. I prefer to hinge it for easy adjustments.

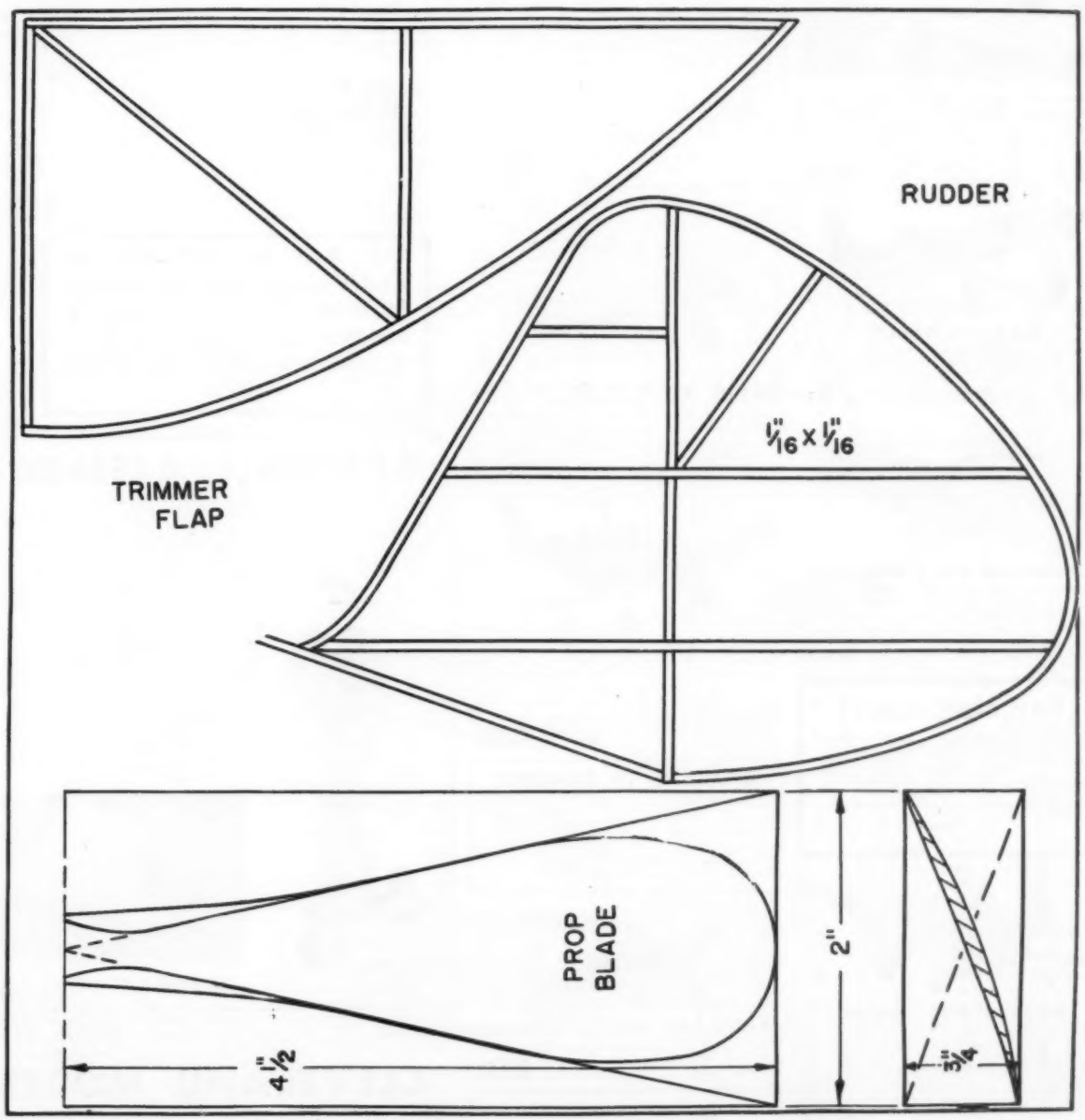
Landing Gear

The landing gear is formed of four bamboo struts and a wire retainer. The front struts are 5¾" long and the back ones 5" long. The struts are streamlined, then one end is sharpened and burred and fitted into a hole specially prepared for it in the fuselage. The landing gear should have a spread of 5½". Next, a wire retainer is bent from stiff music wire and cemented into place. It is a combination spreader bar and axle in one piece and its shape may be gotten from the assembly drawing. It is bound to the bamboo struts with thread and cemented firmly. Wheels are put on the axles and the ends of the wire bent up. Wheels may be of practically any type with the exception of balsa as they would be too light. Wheels should be 1¾" diameter. A tailskid is bent from wire and cemented to the trailing edge.

Propeller

The prop is carved from a block 11 x 2 x ¾". Leave the blades fairly thick at the hubs, about 3/16", and taper them to 1/16" at the tips. Balance it carefully after you have finished carving and give it two coats of dope. Carve a nose block out of a block of medium-hard balsa to the shape of former No. 1 and round it off in front. An

(Continued on page 32)



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"Shout it, boy,

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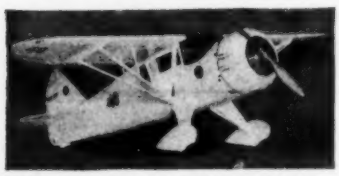

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The Kit B of

GREAT LAKES SPORT TRAINER 2T1-E annou
C-D fleet—the ship that changed almost ev n st

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a Kit, with its highly engineered
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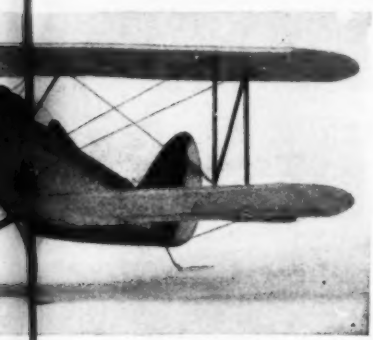

Buof the Year!

1-E—amous design was formerly the flag ship of the st ever on standard in the model aircraft industry. The origin for $5.50, and being such an excellent flyer, so m ests that we bring back this beautiful number, ave d and to show the extra quality in the present day design number is now being sold for 50c and is legitir price del is almost identical with the older design, with but few exce the changes are really improvements, so that you can see re an tter models at 50c today that we did a few years ago at —at l price! And the old Kit didn't even include printed out yet a orth bargain at the time (from '29 to '32). This will show resent model value (SF-1 Great Lakes Sport Trainer, Model ') stan is several times better in general design and a far better in the old originally at $5.50 This fine flying model Kit, r exp "REP" Kit (yes, it's ¾" scale, too—do you want more?), ted c ange and black. Kit No. R-X5003, complete **50c**

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7½ ft.	$ .03
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7½ ft.	.05
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50 ft.	.30
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Landing gear fully retracted as on the prototype, coloring suggested all silver: insignia supplied. Kit R-59 complete (except liquids) postfree only **50c**

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Authentically redesigned. Recommended for both flights and exhibitions. Span 10⅝". Suggested coloring: yellow and green. Kit D-5, complete (except liquids), only **50c**

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This really is a swell flyer—and a typical C-D authentically detailed job. In big demand—better hurry. Kit R-52, complete (except liquids), postfree, only **50c**

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Hard to tell this actual 20" model photo from our ¾" model. Full of typical C-D authentic features and details. Speedy flights. Kit R-21, complete (except liquids), postfree, only..... **50c**

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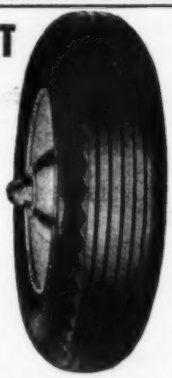

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The 1936 "Nationals"

(Continued from page 11)

Of the 433 contestants, 78 were over twenty-one years of age, or in the open class, and 355 under twenty-one. There were six women and girl contestants. Twenty-seven states were represented and four foreign countries, Great Britain, France, New Zealand and Canada. The list of the number of contestants from each state and the various countries follows:

Illinois—51; Ohio—48; Michigan—45; New York—31; Pennsylvania—29; New Jersey—26; Missouri—16; Indiana—14; Massachusetts—11; Oklahoma—7; California—6; Canada—26; Great Britain—14; New Zealand—9; France—6.

Official Results of All Events

Louis Casale of Syracuse, New York, who is twenty-three years old, won the Exhibition Scale Model Contest, no age limit, with a Waco Taperwing model for which he was awarded 98 points. His prizes were the MODEL AIRPLANE NEWS Trophy and Miniature, a year's subscription to MODEL AIRPLANE NEWS and a year's subscription to "The Model Craftsman." The other winners and their ratings follow:

2. Bronik Soroka, 20, Cleveland, Ohio. CURTISS FI1C-2, 97.9. Awarded DETROIT TIMES TROPHY
3. Harry Walker, 22, Cleveland, Ohio. BOEING P-12 NAVY, 96
4. Carroll P. Krupp, 18, Akron, Ohio. FAIRCHILD 24, 95.8
5. Fred A. Mayfield, Jr., 18, Akron, Ohio. BOEING F 4B-4 NAVY, 95.4
6. Kenneth E. Bonesteel, 17, Akron, Ohio, CURTISS XF11C-2 NAVY, 94
7. Kenneth Diget, 23, Battle Creek, Mich. AERONCA "LB", 93.8
8. Donald Dodd, 16, St. Louis, Missouri. SIKORSKY S-42, 93.6
9. Stanley Stanick, 17, Salamanca, N.Y. FLEET TRAINER F-10, 92
10. Earl E. Brinning, 20, Detroit, Mich. STINSON RELIANT, 91
11. Julius Takacs, 21, Cleveland, Ohio. COMPER SWIFT, 89
12. Fred A. Mayfield, Jr., 18, Akron, Ohio. "MR. MULLIGAN", 88.9

Albert A. Judge of Great Britain won the Wakefield International Contest, no age limit. The average of three flights was four minutes, nine and nine-tenths seconds. All times which follow show the average made with three flights. Mr. Judge's awards were the Wakefield Trophy which he holds for one year, a gold medal and a year's subscription to "The Model Craftsman". The other winners were:

2. Roy Wriston, U.S.A., 4 02.7. Detroit Times Trophy and gold medal.
3. Robert Copland, Great Britain, 3 23.8
4. Dick Everett, U.S.A., 2 59.2
5. J. B. Allman, Great Britain, 2 43.3
6. Gordon S. Light, U.S.A., 2 40
7. Denis Fairlie, Great Britain, 2 05.6
8. Andre Vincre, France, 1 49.2
9. G. Dubois, (Brown) France, 1 47.7
10. John Ginnetti, U.S.A., 1 36.8
11. Charles L. Tracy, U.S.A., 1 34.3
12. W. G. Alexander, (Marchi), New Zealand, 1 23.4
13. A. Pearce, (Pond), New Zealand, 1 19.7
14. Alwyn Greenhalgh, Great Britain, 1 15
15. William E. Atwood, U.S.A., 1 13.7
16. Harry A. Jones, Great Britain, 1 10.1
17. H. J. Robinson, (Lanzo), New Zealand, 1 09.3
18. Fred Hollingsworth, Canada, 1 05.2
19. Paul Verdier, Canada, 1 04.2
20. Henri Varache, (Lanzo), France, 1 01.8
21. Henry Verdier, Canada, 58.7
22. W. B. Mackley (Cahill), New Zealand, 56.6
23. Mel Bardsley, Canada, 55.7
24. J. Finlayson, (Chadwick), New Zealand, 37.6
25. Ray Smith, Canada, 27.7
26. R. MacGregor, (Hoyser), New Zealand, 27.7

The Moffett International Contest, no age limit, but which is won by an average time of three flights, was won by Vernon B. Gray of New Zealand. His time was 44 min., 14 sec. His prizes were a miniature Moffett Trophy which he holds permanently, the Moffet Trophy which he holds one year, one year subscription to MODEL AIRPLANE NEWS and *"The Model Craftsman"*. The following placed in the order named:

2. Bob Jeffery, U.S.A., 10 58
3. A. Worley, (Copland), Great Britain, 9 45
4. Bruce Luckett, U.S.A., 8 40
5. W. Worden, (Judge), Great Britain, 7 40
6. A. Gibson, (Jones), Great Britain, 6 15
7. Jesse L. Vint, U.S.A., 5 10
8. Vernon Boehle, U.S.A., 3 25
9. H. Simmons, (Allman), Great Britain, 2 34.9
10. Edward Lidgard, U.S.A., 2 15.3
11. Ray Smith, Canada, 2 07.6
12. Andre Vincre, France, 1 42.2
13. Donald Krause, U.S.A., 1 40.6
14. Paul Verdier, Canada, 1 33.8
15. W. B. Mackley, (Everett), New Zealand, 1 31
16. John Lemick, Canada, 1 26
17. Ernest Barrie, Canada, 1 18
18. H. Francis, (Fairlie), Great Britain, 1 16
19. H. J. Robinson, (Light), New Zealand, 1 12
20. A. Pearce, (Pond), New Zealand, 1 01
21. Owen Corfield, Canada, 31.5
22. P. T. Beales, (Sommers), New Zealand, 25
23. Henry Verdier, Canada, 17.6

The Mulvihill Contest for Outdoor Stick Models, Hand-Launched, was won by Bruce Luckett, Jr., 16, of Tulsa, Oklahoma with a flight of 41 min., 41 sec. The age limit of this contest was under 21 years. He was awarded the Mulvihill Trophy for one year and a miniature permanently, a 1000 mile plane ride by American Airlines, a life subscription to "Model Aircraft Builder", merchandise order for $10 by "The Model Craftsman," and a year's subscription to MODEL AIRPLANE NEWS. Other winners were:

2. Alvie Dague, Jr., 16, Tulsa, Oklahoma, 23 03. Awarded Detroit Times Trophy.
3. Jesse L. Vint, Jr., 17, Tulsa, Oklahoma, 10 00
4. Robert Toft, 16, Minneapolis, Minn., 9 31
5. Mike Karlak, 19, Cleveland, Ohio, 8 44
6. Albert F. Broz, 18, Cleveland, Ohio, 8 17
7. Frank Ehling, 19, Jersey City, N.J., 7 36.8
8. John Foster, 16, Indianapolis, Ind., 7 09
9. Frank W. Franz, 19, Detroit, Mich., 7 05
10. James Cahill, 18, Indianapolis, Ind., 6 40
11. Edmund B. Swort, 17, Chicago, Ill., 6 33
12. Torrey L. Capo, 19, Quincy, Mass., 6 02
13. John S. Romanowski, 20, Jersey City, N.J., 5 51.4
14. Steven Thomas, 20, Akron, Ohio, 5 43.2
15. Reuben Snodgrass, 17, Tulsa, Oklahoma, 5 30
16. Ervin Leshner, 17, Philadelphia, Pa., 5 17
17. Roy A. Carlson, 16, Springfield, Mass., 502
18. Leon Klesman, 16, Chicago, Ill., 4 58
19. Wallace Simmers, 17, New Lenox, Ill., 4 34.5
20. Leo Bailey, 18, Akron, Ohio, 4 33
21. Alvin S. Gaskill, 19, Atlantic City, N.J., 4 14
22. Daniel J. Clini, 19, Springfield, Mass., 4 09
23. W. Hewitt Phillips, 18, Belmont, Mass., 3 58.5
24. Bronik Soroka, 20, Cleveland, Ohio, 3 51
25. Lawrence Smithline, 19, New York City, 3 47.8

Sheldon Bell of Toledo, Ohio, won the Outdoor Stick Model Contest for the Balfour Trophy in the Open Age Class, with an age limit of over 21 years. He made a flight of 6 min., 30 sec. His awards were the Balfour Trophy for one year, a gold medal and a year's subscription to "The Model Craftsman". Other contestants who placed were:

2. Richard Korda, Cleveland, Ohio, 5 32. Awarded Detroit Times Trophy.
3. Melvin Bardsley, St. Catharines, Ontario, 4 15
4. Vernon Boehle, Indianapolis, Indiana, 3 56.5
5. Robert J. Cahill, Indianapolis, Indiana, 3 17
6. Jacob Friedman, University City, Mo., 3 16
7. Frank Nekimken, Chicago, Ill., 3 12
8. Michael J. Roll, Dearborn, Mich., 2 50
9. Frank Zaic, New York City, 2 47.6
10. Vernon A. Hanson, Minneapolis, Minn., 2 41
11. Dick Bodle, Akron, Ohio, 2 38
12. Owen Rothrock, Detroit, Mich., 2 30
13. Gerald P. Weisinger, Hackensack, N.J., 2 18
14. Roy Wriston, Tulsa, Oklahoma, 2 10.2
15. Ernest A. Walen, Springfield, Mass., 2 06

In the Stout Outdoor Contest for Cabin Fuselage Models, R.O.G., age limit of under 21 years, Ervin Leshner, 17, of Philadelphia, Pa., was the winner with a flight of 36 min., 1 sec. He holds the Stout Outdoor Trophy for one year and a miniature permanently. Other awards he received was a year's subscription to MODEL AIRPLANE NEWS, $10 merchandise order by "The Model Craftsman," a 1000 mile plane ride

(Continued on page 45)

Designing Your Fuselage Model

A Complete Outline of Rules and Procedure of Design That Will Enable You to Design a Fuselage Model of Unsurpassed Stability

Chapter No. 5 — Article No. 54

By CHARLES HAMPSON GRANT

WITHOUT question there are many model plane designers who have created models of one particular type which have flown faultlessly. On the other hand, many of these same designers have lacked the knack of producing successful designs of some other type. In such cases it is apparent that failure is due to lack of knowledge in respect to some factor or principle characteristic of the design of such a plane.

Basically, the principles underlying the design of all planes are the same. However, different types of planes often require a *modification* in the application of the basic principles, due to their type or structural characteristics, or impose the consideration of some distinct factor peculiar to itself. The fuselage model is a good example of this state of affairs.

Fundamentally the principles underlying its design are the same as in the case of the stick model, and therefore the same procedure of design should be followed which has been outlined in the last seven articles of this series. There are several requirements peculiar to the fuselage type, however, that do not enter into the design of the stick model but which are important if satisfactory performance under all conditions is to be realized.

Let us outline therefore, the design of a fuselage model in order to comprehend the significant modifications not embodied in the design of a stick model. The basic characteristics that should be considered when proceeding to design any model plane are as follows:

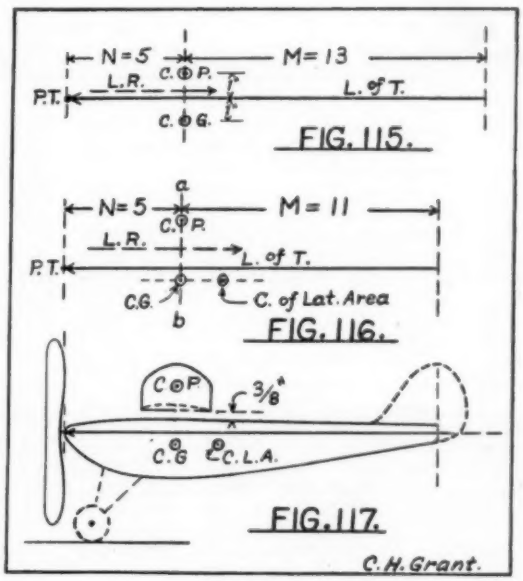
1. The purpose for which the model is to be designed.
2. The basic arrangement of the aerodynamic forces that will fulfill the purpose.
3. The type of model most suitable for the purpose.
4. The size of the model.
5. The relative proportions or size of each structural or aerodynamic factor.
6. The shape of the features of the model.

The same reasoning holds when designing the fuselage model, as outlined for the stick model in the February, 1936 issue, page No. 36. We follow the same procedure.

Like the stick model, the *purpose* is to design a model with extreme stability but with a fuselage instead of merely a single stick for the frame.

Arrangement of Forces

The aerodynamic factors that must be properly arranged to produce stability are: 1. Center of gravity; 2. Center of lift; 3. Line of thrust; 4. Point of thrust; 5. Stabilizer reaction; 6. Fin reaction; 7. Center of lateral area; 8. Wing dihedral; 9. The individual weights of the structure comprising the model.



The arrangement of these factors should be the same as in the case of the stick model, except for slight modifications which will be made as we proceed. As a basis of design therefore, lay out the regular force system as shown in Fig. No. 115.

The model should be of the monoplane type, like the stick model, and for the sake of simplicity and clear understanding, the same wing span will be used; i.e., 24 inches.

Now it is necessary to make slight changes in the force arrangement layout shown in Fig. No. 115, required because of structural differences between the fuselage type of model and the stick model.

The first consideration is the length of the tail moment arm. The part of the fuselage model to the rear of the wing is bulkier and heavier than in the stick model. Therefore it is advisable to make the tail moment arm of the fuselage model shorter than the stick model moment arm. Otherwise the nose of the fuselage plane would have to be made heavier or longer or both, in order to balance the weight of the heavier rear part of the fuselage.

A moment arm of 13 inches was chosen for the stick model, which was exceptionally long. If the wing tips were squared or rounded instead of being tapered as shown in the plan given in the preceding issue of MODEL AIRPLANE NEWS, the moment arm of your fuselage ship should be made 12 inches long (½ wing span). However tapering the tips reduces the "span effect" so a slightly shorter moment arm should be used in order to keep the length of the nose down to reasonable proportions. A long nose neutralizes the beneficial effect of a long moment arm. Any reduction in stability that may result can be compensated for by the use of a larger stabilizer. A moment arm length of 11 inches should be satisfactory.

The next factor to be considered is the length of the nose N, Fig. No. 115. Is the nose length of 5 inches, assigned to the stick model, correct for our fuselage model? The general rule for this is, make (N) about 50% of (M). This means that the nose length (N) should be about 5.5 inches, however we will make it 5 inches for stability's sake. Thus the distance from the propeller bearing in the nose of the fuselage to the center of the stabilizer should be laid out on your planning board as the basis of your modified force diagram, Fig. No. 116. (N) is the distance from the prop bearing to the center of gravity, so the center of gravity should be located at some point on the vertical line (ab).

Next draw the line of thrust, represented by a horizontal line, so that it intersects line (ab). Mark point of thrust (point at which the propeller bearing is located) on the L of T as well as the point representing the rear end of the moment arm. On the diagram, the distance from line (ab) to the point of thrust is (N) and the distance from (ab) rearward to the center of the stabilizer is (M).

The next step is to determine the center of lift of our fuselage model. Due to the fact that the top of the fuselage must necessarily be above the line of thrust, it is obvious that the wing will extend out from the sides of the fuselage from a point slightly below the thrust line, provided the wing is given the same dihedral of 3½ inches, and the center of lift is located at the same point as in the case of the stick model.

Position of Center of Lift

However the point at which the center of lift should be located is dependent upon the position of the C.G. If the position of this latter factor can be located as indicated in the diagram No. 115 representing the stick model force arrangement, then the position of the wing and the center of pressure need not be changed. This is not usually the case in the design of fuselage models. As a rule the center of gravity would be slightly higher relative to the thrust line than the stick model. This is due to the fact that the center of weight of the fuselage is above the point repre-

(Continued on page 47)

Aviation Advisory Board

Conducted by
CHARLES HAMPSON GRANT
Chairman of the Board
Formerly of
The Technical Section, Air Service, U.S. Army

KIDNAPPING is a dastardly crime. There is not a mother or father who has raised a child, sacrificing many joys and undergoing great sacrifices to give their son or daughter all possible advantages, who does not appreciate the feelings of Mr. and Mrs. Charles A. Lindbergh, for instance; or those of any other mother or father whose son has been taken away from them surreptitiously. Probably young men do not appreciate, until they have children of their own, what struggles their mothers and fathers go through to insure their health, wealth and happiness.

Unquestionably, they would be more considerate if they stopped to reflect upon this more often and more deeply.

We are sorry to say that our "guiding light" and the thing which we have looked up to with great reverence has turned to kidnapping; that is, AVIATION. It appears that aviation has "kidnapped" a young man who lives in Waukesha, Wisconsin, and the mother and father are going through the tortures that all parents go through under similar conditions. This appeal is made particularly to a young man who has forsaken everything, evidently, for aviation. He is Joseph Kuranz of 402 East College Avenue, Waukesha, Wisconsin.

We can understand how he might be carried away with enthusiasm and also that he has probably not given all phases of his act consideration. It appears that he has left home without a word to his family for the purpose of following an aviation career. As far as the career is concerned this is commendable, but to satisfy one's desires at the expense and the suffering of other people, is not. In this case it is unquestionably due to a lack of understanding. Therefore, we entreat you, Joe, if you read this to get in touch with your parents immediately and let them know something of your whereabouts. They write that they do not object to your following such a career, if you will merely let them know that you are safe and well.

You owe this to them and we are sure you will follow this suggestion if you are a true aviation enthusiast; for the first requisite of this game is to be "square" with yourself and others. If you cannot do that you cannot be "square" to aviation. Mr. Grant, as editor of MODEL AIRPLANE NEWS, would appreciate greatly a personal word from you.

Now we have some questions which will probably be of interest to more than one particular reader. Bob Lichten of 243 West School Lane, Philadelphia, Pa., wishes to know:

Question: What is used to make a good rubber motor lubricant?

Answer: A mixture of one part glycerine and three parts liquid green soap makes an excellent lubricant. This should be rubbed into the motor thoroughly with the fingers. The motor should be well saturated with it.

Question: What chemicals are used to make a good microfilm solution?

Answer: The liquid used may be any nitro-cellulose liquid compound; such as collodion, nitro-cellulose cement, or similar substances.

We suggest that Mr. Lichten read the articles on microfilm printed sometime ago in issues of MODEL AIRPLANE NEWS. The authors are Mr. John S. Young and Mr. Herbert Greenberg.

Mr. Allen Swanson of 2402 D Street, Lincoln, Nebraska, has a few questions which are very interesting. The first one is:

Question: If a parasol wing is divided into two symmetrical panels and attached to the fuselage so that a mid-wing or a low-wing type results, does not the total lift remain about the same or slightly less?

Answer: In one instance the lift remains practically the same. However, the drag is increased when the wing is attached directly to the fuselage. Thus, in effect the L/D is less. Because the lift is the same and the drag is greater, the efficiency of the machine is less and less lift will be produced with the same power.

Another condition contributes a greater lifting effect on the machine when the wing is parasol. On a parasol wing, the tail must be placed less negative, in fact often positive, to the line of thrust; in which case lift is produced by the tail surfaces. In mid-wing or low-wing types, the stabilizer must be placed at a negative angle or more negative than when the wing is parasol. Thus greater drag is produced and no lift results, while the whole machine, therefore, lifts less than a parasol type of plane.

Question: Assuming that a negative pressure exists over the top of the fuselage and a positive pressure below, under the influence of the divided wing, as mentioned above, does not such lift on the fuselage result at the expense of the lift on the two wing panels, thus reducing their efficiency?

Answer: No, this is not true. The fuselage effect in the case of the mid-wing or low-wing actually creates a certain amount of lift. However, this does not compensate for the loss in efficiency or increase in drag due to interference caused by the wings being joined to the fuselage.

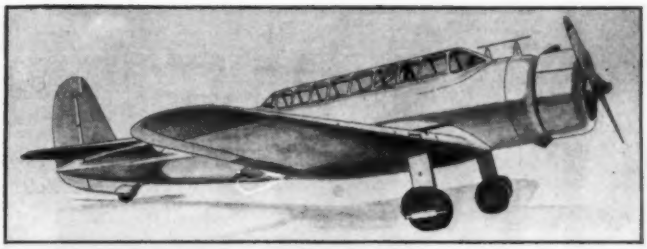
We suggest that Mr. Swanson read the National Advisory Committee for Aeronautics report for further information of this nature.

Allen Jones of 509 West Avenue, Waukesha, Wisconsin, wishes to know the answer to the following question:

Question: What airfoil would you sug-

(Continued on page 41)

Rear Admiral Ernest J. King and his new Flag Plane. It is similar to the 135 scout observation planes just completed by the Curtiss Aeroplane and Motor Company of Buffalo, New York, for use by the Cruiser Units of the U. S. Navy.



The Vultee V-11 Attack Bomber, drawn by Harland Wood

AIR WAYS

HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Send Pictures and Details of Your Experiments

Air Ways Club News

THE big news this month is, of course, the National contest, an account of which will be found on other pages of this issue. However, many Air Ways Club members were not able to attend this gala event, so we have considerable news concerning their activities.

Harland C. Wood of Middleton, Mass., comes back to us again with a very beautiful representation of a Vultee V-11 Attack Bomber which is the heading for our page.

The place of honor goes to Milton George of 240 Princeton Avenue, Palmerton, Pa., who is shown in picture No. 1 with the completed framework of his Douglas transport. We wish to commend him for the fine piece of work he has accomplished. Readers will note the detail and the careful construction of this ship. George says that he made it from plans which he drew from a ⅛" scale three view. The model is ¾" to the foot and is sixty-three inches from tip to tip of the wings. Its weight is fifteen ounces. It cost about fifteen dollars to build and the time required was eight months.

Pict. No. 1. Milton George with the completed framework of his scale model Douglas transport

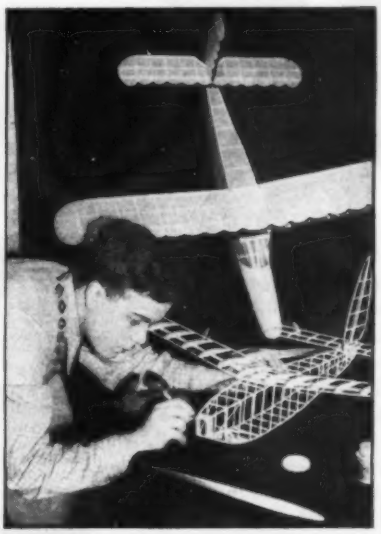
We have a picture from Joe Rote of 1336 Kenilworth Avenue, Lakewood, Ohio, which looks very much like the "real McCoy." Who would think that the little ship shown in picture No. 2 was not a full size plane? Rote says it is a model of the real ship, in which he learned to fly. He made the model from scale factory plans and built it with the same number of ribs and members as the real ship. It has a span of twenty-six inches. He says it is purely an exhibition model with miniature seats, movable cabin enclosure, small laminated prop and all other details. At the least it is a very excellent piece of work.

Picture No. 3 represents an incident which is common in the life of every model builder. Readers can well appreciate the feelings of the owner of this ship. A more complete mass of kindling wood was never depicted before. At one time, previous to the taking of this picture, it was a Lockheed Sirius belonging to Warren Berry of

(Continued on page 42)

Pict. No. 4. A six inch Vought SU-1 by Henry Clark compares its size with a quarter.

Pict. No. 5. Here is a perfect scale model of a DeHavilland 4 by M. Walter Munk



Pict. No. 6. One of the English model builders who entered the trials for the Wakefield contest team

Pict. No. 3. There are real heartaches in this crack-up of Warren Berry's Lockheed Sirius

Pict. No. 2. Not a real plane but an exact model of a Taylor Cub, by Joe Rote

Pict. No. 7. Judges and winners of the scale model contest sponsored by the R. F. Taylor American Legion Post No. 121 of Indianapolis

Building the Arup Flying Wing

(Continued from page 23)

aluminum tube is put through the nose block to act as a bearing. A square of balsa is cemented to the back of the nose block which just fits the opening in former No. 1. Then the prop is put on, the rubber installed, and you are ready for flying.

Flying

I don't believe you will have any trouble with this plane, but if you do, treat it just as you would any ordinary model. If the model stalls, add weight to the nose or turn the flippers down (the latter being preferable up to a certain point). Two cylinders may be put on the nose, one on each side for realism.

One more thing, do not fly this model when it is very windy as the large area of the wings with the very light wing-loading allows it to be taken for a ride by a stiff wind.

If you like, free-wheeling may be put on the prop to increase the glide to a point where the model will soar beautifully. Combine free-wheeling with winding with a winder and you have the net result of some very pretty flights. Good Luck!

How To Build the Wakefield Mayfly II

(Continued from page 13)

being the most efficient type for American use, one must not lose sight of the vastly different conditions under which we fly. I have found that a medium type prop is the most suitable for our general use, the fairly fast revs. giving the machine a good climb to the upper regions where the thermals are the more likely to be found.

By using a box arrangement for the main spar, I introduced an arrangement that I have conclusively proved to be the strongest method coupled with lightness that it is possible to find. It is not difficult to make and in tests was proved to be three times as strong as a corresponding spar made from the solid, with a saving of over 50% in weight. Coupled with a fair sized leading and trailing edge, this wing has stood all kinds of hard wear—the only occasion when repairs were necessary being the time it wrapped itself around the radio control tower at our local airport.

One factor that might present itself is the ease of transportability gained by the fact that everything is detachable, with a consequent small packing space. This is a point that has struck me in the majority of American designs—especially flying scale types—it being almost necessary to have a truck to convey the models to a contest!!

It will be noticed that use has been made of balsa veneer as a strengthening material at various points. This I have found more than compensates for the slight extra weight involved, and I am now experimenting with the use of fillets, etc., it being my opinion that the improved streamlining obtained will more than outweigh the disadvantage of additional weight. I have come to the conclusion that streamlining is of paramount importance in the advance of model design, just as it is in full size practise, and I think the most conclusive proof of this is the experiments made by Frank Zaic, and reported by him in his recently published "Model Aeronautics Year Book."

Before getting down to detail description, may I clear myself by saying that this is not exactly a super-duration model, though the ability to shine in this direction is there. Strength, ease of handling, and a consistent average duration of proportions to enable it to hold its own are the main features, and one must not lose sight of the fact that this machine was designed specifically for English conditions. Modifications to suit American conditions may be advisable, and I should be pleased to hear from anyone who tackles this job as to any alterations made—if any—and their experiences in both building and flying this 'brain-child" of mine.

And now to the real job of construction:

Fuselage

This is constructed from medium hard balsa, the longerons being of 3/16" x 3/8" L section, with uprights etc. of 1/16" x 1/8" and 3/16" x 1/8" T section. This latter section is used at the main stress points such as the under-carriage bay, and the points where the wing holding bands pass round the fuselage. Corner braces are inserted at these points with a view to taking the twisting strains that take place under full turns.

Cross-bracings are all inserted on the inner faces of the fuselage sides. When steam-bending the longerons, I have found it best to hold them in pairs, back to back as shown in sketch, this method obviating the tendency to kink. When building the sides, I pin the longerons to a board with very fine pins. After one side is completed, this is taken up and reversed, the second side being built directly on top of the first. We thus have the two sides together with the outer faces meeting. Before separating, it is easiest to sand the outer edges all around, thereby insuring that both sides are equal. The sides are now split apart with a razor blade, and the outer faces smoothed.

After the cross pieces are inserted, the fairing on the nose is formed with 1/16" square stringers and 1/32" sheet balsa. This forms a really strong section, able to stand a great deal of knocking about, and at the same time something one can really grab whilst the motor is being wound.

The rear motor fixing consists of a bamboo peg, this method being very easy to handle. Tail skid is also of bamboo, of easy and simple design as will be seen from the drawing.

Undercarriage

Formed of bamboo, wire and 2" balsa stream-lined wheels, this portion is simple yet with ample strength to take care of all normal landing shocks. When not in use the legs are disconnected by removing the rear pins from the brass tubes, whereon the whole folds flat along the fuselage, making for a saving in packing space.

Nose Piece

This is made from 3 ply hard balsa, with a brass bush to take a prop shaft of 16 gauge piano wire. (It should be noted that all wire sizes quoted are of English gauge).

The method of free-wheeling is seen best in the illustration, while the method of prop retention makes for an easy and quick change should same be required.

The size of wire used for the shaft could be reduced, but I use this gauge as standard on all my machines, with the advantage of being able to use any prop I may have on any machine. This will be found of advantage in experimenting—and saves one being stuck should the prop to any particular machine be broken.

Propeller

Cut from a block of hard balsa, 16" x 1¾" x 1¼" the original was left rather on the stout side. The method used by Frank Zaic, e. g. carving the blades thin and covering with Jap silk would I think be a distinct improvement. Leave the hub strong, as the winding is done by the prop. Alternately, an S hook could be used engaging with the prop-shaft.

Wing

This, perhaps the most important part of any model, is of fairly easy and straightforward construction. The section used, R.A.F. 32, enables a good depth of spar to be used, and by utilizing the box-spar arrangement before mentioned, a degree of sturdiness is obtainable that will take care of a good deal of knocking about.

The main spar is made by cutting four side plates from 1/32" stock, and assembling into box form with the aid of 1/16" square balsa strips as shown.

Ribs are of 1/32" stock, with the exception of the four center-section ribs and the first two ribs out from the center, which are of 1/16" hard balsa. A good, solid leading and trailing edge to the dimensions shown, with sheet balsa tips make for a strong job.

The ribs are slotted onto the spar as shown, this method preventing the covering from sticking to the spar and spoiling the section. Riblets are used to prevent sagging and contribute their quota of strength to the whole. Note that all ribs and riblets are cut out for lightness fore of the leading edge.

The center section entails a bit of extra work and can be omitted if the builder doesn't mind carrying a "coffin" around with him, the only reason for the halving of the wing being for ease of transportation.

Two ⅛" dowels are used, fixed to one half, and sliding into tubes located in the opposite half. The tubes are made from 1/32" sheet wrapped around a piece of the doweling used. The drawings should make this part clear. Four small bamboo pegs are cemented into the center section to take the rubber fixing bands.

A dihedral is built in to the extent of 3½" at the tips.

Tail Plane

Of straightforward construction, this consists of 1/32" ribs of a neutral section, ⅛" x 3/16" leading edge, ¼" x 1/16" trailing edge, and a tapered spar cut from 3/32" stock. Ribs are slotted onto the spar as in the wing.

The spar and trailing edge are carried through in one piece, and the required incidence is obtained by the depth of the wire saddle. Note the spar goes into the slot cut in the fuselage stern post, and is locked in position by the fin. Balsa veneer is used as shown, this preventing the pulling inwards of the end ribs, with a consequent slackening of the fit to fuselage.

Fin

This consists of 1/32" ribs slotted onto a T section spar, with leading edge of ⅛" square, and trailing edge of ¼" x 1/16". The T spar gives a good, stiff structure, and the fixing to the fuselage by the two bamboo pegs shown saves any wobbling. Adjustment is made by the double-wire saddle, the bottom rib being a sliding fit in this. It should be noticed that the interlocking method employed enables the complete tail assembly to be fixed by one rubber band.

Covering, Etc.

The whole machine is covered with superfine Jap tissue, water doped, and given one coat of clear model dope. On the original, I waterproofed the whole machine (after the decoration and coloring had been applied) by the use of a clear cellulose varnish thinned down with dope thinners. This latter operation is rather necessary in our damp climate if one wants "all the year round" flying.

Power

Ten strands of 3/16" black rubber are used, with an original length of 2" slack above the mean length between hooks. This of course stretches with use.

Maximum turns are about 850 with safety, stretching the motor 2½ times.

In conclusion, I should like to acknowledge the great help received from Mr. J. W. Kenworthy during my short period of model aeronautical activities, without which I should still be struggling along with the greenest novices. The fuselage construction used in the "Mayfly" is a development of his successful "Conqueror" model, that won the Wakefield Trophy in 1933.

And now—those interested enough, get to it,—and don't forget to let me know how you get on. I should be glad of any data such as performance, etc., to enable me to check up on my figures—always with a view to bringing out something better.

Build And Fly This Simple Biplane

(Continued from page 7)

vent the rib from bowing toward the tip when the tissue covering shrinks. Sand the spars to shape after the ribs are in place.

The fin and stabilizer may be covered on both sides before they are assembled into the tail unit. On the top side of the stabilizer, the tissue is cut out between the two No. 1 ribs. The 1/16 x ¼ x 3⅞" tail boom spars are cemented in place and the fin is set in between them. Small balsa blocks are cemented between one tail boom spar and the front and rear fin spars so that the fin will set firmly. Blocks are referred to as "Y" on the drawing.

The tail boom members are secured to the motor stick by wrapping with ordinary cotton twine. Do not use thread. Wrap a number of turns very firmly. This type of mounting is very desirable in that it provides complete adjustment

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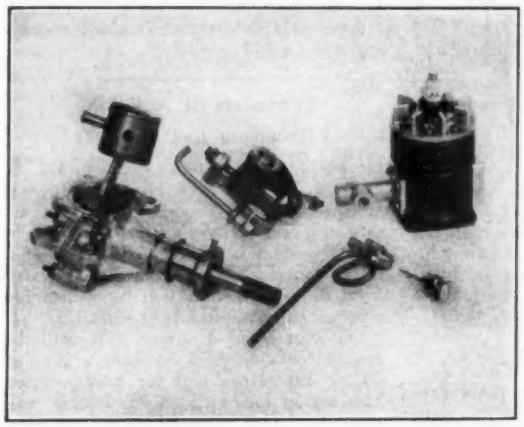

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Everything is in the kit including plug, coil, condenser, tank, ignition wire, cylinder, piston, connecting rod, timer, crankshaft, all screws, nuts, bolts, etc. Every part is fully machined and finished. No oil, gas, batteries or propeller included. Postpaid for only.....

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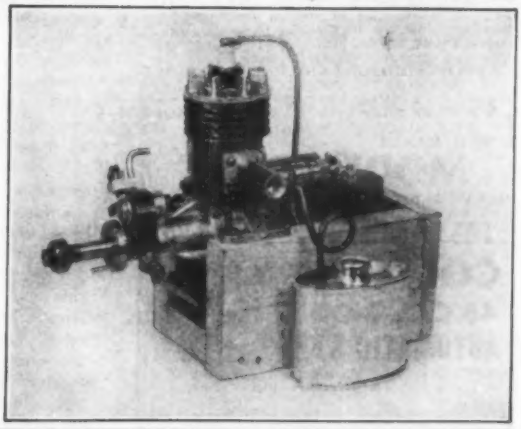

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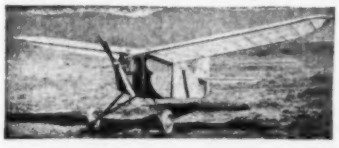

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of the angular setting of the stabilizer and also right or left rudder can be obtained with the fin.

Landing Gear

Bend the bamboo spreader bar from 1/32 x ⅛" or wider stock. After it is bent trim down to 1/32 x 3/32". In bending bamboo, always use the skin side of the wood on the outside of the bend. In this particular case it is not possible to follow the rule entirely. However, the skin side may be the outside (of the bend) at the sharpest curve, which occurs near the wheel.

Put the wheels on the axle and bend the wire around at right angles as shown to hold the wheels on. Then put the spreader bar in place and secure with thread and cement. The top of the bamboo is supported by a .020" music wire brace "H".

Miscellaneous

This model is designed so that the center of gravity is located near the nose. This weight position is partly obtained by the use of a hard balsa propeller, which feature is rather important. A machine cut prop will do although a well made hand-carved prop is much better in this case. If the latter is used, it may be carved from a block ⅞ x 1¼ x 9", marking it out in the familiar "X" type or a modification of it.

The thrust line setting in this model is important. It may be necessary to make some slight adjustment of this factor when test flying it. Adjustment was effectively obtained on the original with a Multi-Flex bearing. One or more coats of dope are recommended for looks, durability as well as flying qualities. The added weight from a reasonable amount of dope will not be a hindrance. About six strands of ⅛" flat brown rubber is required for flying.

Try your model in calm weather. First set the wing in proper relation to the center of gravity. Then set the stabilizer until a good glide is obtained. Remember it is necessary to get the "feel" of any particular ship in order to launch a completely smooth glide even though all adjustments may be perfect. After satisfactory gliding is secured, wind up for a power flight. Longer and higher flights can be obtained by the use of lubricant on the motor and a mechanical winder. The model can also be flown in a moderate sized gymnasium if set to turn sharply.

Bill of Material

1—9" propeller or block ⅞ x 1¼ x 9" hard balsa
1—prop bearing unit
2—pieces of .034"d. x 18" music wire, straightened
1—pair 1⅜" donut balsa wheels
6—3/16"d. brass washers
4" of .020" music wire
4" of .028" music wire
1—hard balsa motor stick ¼ x ⅜ x 10½"
1—firm balsa spar ⅛ x 5/32 x 18"
2—firm balsa spars ⅛ x ⅜ x 18"
2—hard balsa spars 1/16 x ⅜ x 18"
2—hard balsa spars 1/16 x 1/16 x 18"
2—balsa sheets 1/32 x 2 x 18"
1—hard balsa strip 1/16 x ¼ x 18"
5—strips of 1/16 x ¼" bamboo
1 square inch of .012" sheet aluminum
6 feet of ⅛" flat rubber
1 sheet of Jap tissue
Cement, tissue cement, thread, twine, and dope, plus industry and patience completes the bill!!

Frontiers of Aviation

(Continued from page 17)

for pursuit planes in lots of 25 to 175. It may be possible that Howard Hughes, Northrop, Curtiss, Seversky, Vought, Consolidated, and perhaps others may compete for the contract. It should be very interesting to see who shall win out. One day prior to Sept. 4, bids will be opened for observation planes in lots of 10 to 125.

On November 4 Army bids will be opened for bi-engined bombers in lots of 50 to 250 planes and for multi-engined bombers in lots of 5 to 75. Boeing may have their new enlarged version of their four-engined 299 completed in time for this competition. All pursuit contracts are for single-seaters.

The Curtiss Aeroplane & Motor Company was recently awarded a 40 plane contract from the Navy for scout-observation planes totaling over $750,000. The planes are of SOC-1 design.

At Santa Monica, Calif., the Army Air Corps have been continuing tests with the giant twin-engined Douglas Senior amphibian. This plane is known as the YOA-5 and is powered by 750 hp. Wright Cyclone engines. It holds the distance airline record for amphibians, having flown non-stop from Puerto Rico to Miami, a distance of 1,033 miles. Eleven hundred gallons of gas and eighty gallons of oil were carried on the flight! A novel feature is an enclosed gun turret just forward of the pilot cab of the huge amphibian.

Douglas' new troop carriers for the Army is a combination of the DC-2 and DC-3 transports. It has a huge door on one side of the fuselage for loading large size cargo.

On the new Northrop attack planes the landing flaps will be perforated with holes about six inches in diameter. This prevents tail buffeting, and the flap is still almost as effective as the solid type. Northrop is steadily delivering the attacks to the Army.

Timm will soon begin construction of the first of its proposed twin-engine transports. Many improvements have been made in its design since the first publicity was released on it. There is a possibility that the new high-wing jobs will have Handley-Page slots.

Boeing's new transport may also be a high-wing monoplane. Because of the obstructed view of the ground to the passengers in low-wing transports, it is said that Boeing engineers have been considering the high-wing design to improve vision.

Mr. Shelton has recently test-hopped his small four-place Crusader equipped with a new retractable landing gear. Lady Drummund-Hay, famous English writer and frequent traveler on the "Hindenburg" and "Graf Zeppelin," was present to witness the successful test flight. She was very much impressed with the plane. Speed has

been increased considerably with the new landing gear—over 10 m.p.h. it has been said.

Waldo Waterman is building a new plane similar to his Arrowplane, and it is said that it will be powered by a Studebaker automobile engine. Its name will be the Arrowbile and will be equipped for driving on the ground as the roadable autogyro.

Ryan may produce a higher powered Menasco S-T.

Airspeed of England has designed a wonderful mid-wing monoplane mail carrier that should be very promising. Its 73 foot wing contains the two American 550 hp. Pratt & Whitney Wasps mounted in the leading edge. Large engine nacelles are afforded for housing the retractable landing gear. The long, trim fuselage will hold two pilots up forward with the rest of the space aft for mail and other cargo. Drag has been reduced to a minimum.

The plane, known as the Airspeed A.S. 24, has the following performance and weights:

Weight empty—7,940 lb.
Total weight—15,000 lb.
High speed—200 m.p.h.
Cruising speed—171 m.p.h.
Landing speed (full load)—71.5 m.p.h.
Cruising range—3,000 miles.
Service ceiling—16,000 ft.

Imperial Airways have ordered 12 giant four-engined Armstrong Whitworth landplane transports. Though they are of high wing design they will have retractable landing gears. Engines will be 900 hp. Siddeley Tigers. Very luxurious accommodations will be supplied the 27 passengers. One third of the passengers will be located in a cabin located in the long nose of the fuselage just forward of the wing.

From Germany comes news of interesting developments in airplanes. German engineers have been very successful in making the Diesel engine available for aircraft use. They are now using Diesels up to 650 hp. on their airlines and have produced even higher horsepower Diesels but these are not yet dependable enough for regular airline service. Swissair has purchased a Junkers powered by two 550 hp. Jumbo Diesel engines for flying over Switzerland. The plane is of low-wing design with tail assembly much on the order of the Lockheed Electra. It is Junker's latest.

Dornier engineers have designed a very huge flying boat that may be built in the very near future. It much resembles the Dornier DO-X with the familiar Dornier sponsons instead of wing tip floats. The ship, known as the DO 20, will weigh two tons more than the Dornier DO-X! It will be powered by eight 1,000 hp. engines located in the wing. Two of them, in tandem fashion are connected to each of four three-bladed propellers. The engines being located in the wing give the Dornier very sleek lines. The plane will undoubtedly be used for trans-Atlantic service. It will be able to lift double its own weight which should make it a very efficient airliner.

In England, Miles' twin-engined Peregrine which has just been produced may be put on the market with American Menasco engines as well as the Gypsy-Six power plants now used.

Preparations are still under way for the production of six and ten-place transports by the Seversky Company. These particular planes were described in past issues of MODEL AIRPLANE NEWS many months ago. Design work has been completed and production may begin soon. Both will be equipped as either landplanes or amphibians.

From Lockheed comes more good news of proposed planes. It has been stated in one of their recent news releases that they are designing a large twin-engined transport which will follow after the completion of the Model 12 just produced by the company for light airline work. Details of the new ship have not yet been disclosed. Lockheed also has on its books a $112,000 order for one airplane. The Lockheed Electra sells for about $50,000, Amelia Earhart's special job at $65,000, so it should be interesting to see what this new $112,000 plane will look like. Lockheed will build a new factory at Union Air Terminal, Burbank, Calif., shortly so it may get well under way with production of commercial and military planes on a bigger scale than formerly.

As we go to press, Curtiss has just received an order for 83 Navy scout-bombers. Vought and Northrop also received orders from the Navy for 54 bombers each. Details of these planes will appear in the next issue of this paper.

Rumor has it that Douglas will soon produce a 40 passenger flying boat!

Build A Model of the Aeroneer B-1

A complete description of this plane was given in last month's issue of MODEL AIR-

PLANE NEWS.

Get dimensions from accompanying plans for purchasing balsa wood. If you wish to square off the plans, making it easier for measuring, connect the corresponding dots on border with straight pencil lines. Each square will equal one square foot.

Make the fuselage first. Draw the outline of the side view on stock and cut to shape with a jig-saw. Then draw the top view and cut again. Using a sharp chisel and razor blade, shave off the corners and give the fuselage its final shape. Refer to cross-sections. The cabin may be hollowed out if desired and isinglass used as windows. Go over all surfaces with coarse sandpaper first and then fine sandpaper, making a smooth surface for painting.

In making the wing, draw the top view on stock first and then cut. The wing will be made in three parts, the center section and the two outer panels. Taper down the wing sections as shown by cross-sections and front view with your chisel. Then cut groove in bottom of fuselage to fit the center section. Sandpaper all parts.

The tail surfaces may easily be made from sheet balsa and cut to shape with a razor blade. Sandpaper thoroughly.

In making the landing gear, use the same procedure as you did the fuselage. Slice the pants in half with razor blade and hollow out the inside. Then cement halves back together again and insert wheels which may be purchased or made. Use a small straight pin as axle.

The propeller is most easily made in three parts. Cut two blades from sheet balsa and cement them to a spinner carved from balsa with your razor blade. Go over all parts with fine sandpaper and begin the assembly.

The assembly of this model is relatively simple. Join the center wing section to fuselage first with model cement. Then connect the outer wing panels. Next cement the tail group in place. When connections have dried, turn the model upside-down and connect landing gear with plenty of cement. The tail wheel may be joined with a small bent piece of copper wire. Using a straight pin as shaft, join the prop to the nose. The wing fillets may be put on with putty. Fill up all cracks and joints with cement and go over entire model once more with fine sandpaper. Brush off all dust and begin the paint job.

Use silver dope for coloring the model. Apply many coats until a smooth finish is obtained. The model will then be completed.

"Gas Lines"

(Continued from page 15)

caneer" is sent us by G. A. Sheill of Algonac, Michigan. Sheill writes us that he powered the model with a Baby Cyclone but has not flown it as yet. His motor mount is so constructed as to allow the removal of the Cyclone to be replaced by a Brown if necessary for more power, in less than 10 minutes. We believe that the "Buccaneer" was designed primarily for the Brown motor but if Sheill has kept the construction light, his Cyclone will fly the model with ease.

Picture No. 3 is sent us by Edward Kershaw of 653 Long Lane, Upper Darby, Pa. The model is a Boeing F4B4 powered by a Brown motor. Kershaw says in part, "I haven't flown the model as yet since I am installing a time switch so that I can test hop it with safety. The time switch can be controlled for flights from 20 seconds to 20 minutes." The time switch seems to us to be as good if not better than the knife switch and string introduced by James Condon some time ago. A number of letters were written us that time which hinted that if a model takes off at ten to fourteen miles an hour how was the builder supposed to run with it unless he was a track man. We like the time switch for the above reason as well as the regulation of time at any flight. Those that have already used the switch, please write giving the results of the test.

Picture No. 4 is submitted by Bob Johnston of 205 Islay, Santa Barbara, California, who won the recent Gotch Airport contest with the same Mr. Mulligan model. That contest was a precision contest which allows only forty seconds running time of gasoline to each entrant. The models are judged for fidelity to scale, workmanship, flight, take-off and landings. The model has a span of 49 inches and weighs 3½ lbs. ready to fly. Because of the fast glide of this model, Bob has attached wing flaps which are operated by a camera timer which drops the flaps at the same time it cuts the ignition on the motor.

Mr. H. Clark of New York submits Picture No. 5 of Paul Zakim's "Cavalier" in full flight at a recent contest at Hadley Field, N.J. The model is well known and needs no description but the photo deserves merit since shots like that are not easy to snap.

Picture No. 6 is sent by Mr. R. K. Allen director of the Pittsburgh, Pa., unit, showing a display of gas models put up under the auspices of the I.G.M.A.A. in the East Liberty Y.M.C.A. during a hobby show. The finished model in the picture, we believe, was built by one of Pittsburgh's most ardent gas model fans, Mrs. R. K. Allen, who enters all the meets and shows the boys up.

One of the most interesting designs submitted in many a moon is shown in Picture No. 7. The model was built by Lowrie McCarty of Kindersley, Saskatchewan, Canada, who writes, "Tests on this 48" span Elf engine powered model show unusual stability and a flat glide. This plane was scientifically designed using data from the 'Aerodynamic design of the Model Plane' published in MODEL AIRPLANE NEWS. The next gas model I am going to build is a three foot KG-3 to be powered by an Elf." Give us more information on the above model, Lowrie, and keep us informed as to progress on the KG-3.

The South River High School Aero Club of South River, New Jersey, submits Picture No. 8 of a KG-3 built by the group. Difficulty in flying this model was encountered by the group because a small 14 inch propeller was used and it took many unsuccessful flights before a sixteen inch, 8 inch pitch propeller was designed, by John Czajkowski, for the

model was used. The results of the flights with the larger propeller are described as follows, "The change in the ship's performance was instantaneous. On the first trial, with the motor at approximately 4000 r.p.m., the plane took off and climbed quickly and steadily to a 100 ft. altitude before the motor stopped due to lack of fuel. It glided slowly into a beautiful three point landing." Members wishing information on gas model propellers should read Joe Kovel's article on gas propellers which appeared in a recent issue of this magazine.

From Mr. O. Van Wymersch of Brussels, Belgium, comes Picture No. 9 showing his son's latest gas model. This we believe is one of the first pictures of a gas model to come to us from Belgium. It is interesting to note how the whole world has taken to this, the most interesting sport and hobby of them all. We expect to hear a lot more from Mr. Van Wymersch about Belgium's gas model activities.

Picture No. 10 shows a group of very interesting gas models entered in the Model Aero Club of France gas model meet held May 21. An invitation was received from the president asking our members to send models for competition but the letter was received too late for publication. We hope that the invitation will be extended next year. We are, however, exceedingly pleased to see the fine turnout of models at the meet. Europe has caught the "spark" which means that we will have to go on with our pioneering in this field to keep ahead and retain our supremacy.

UNIT ACTIVITIES

Newark, N. J.

Mr. E. B. Berlinrut, Director of Unit No. 2, the North Jersey Gas Model Association, reports that the unit is functioning in a highly satisfactory manner. He writes in part, "The group meets on the first Friday of each month in the Newark Y.M.C.A. which very graciously donates the space. We found the first two meetings were a little disorganized because of the number of youngsters attending who did not pay attention to the speaker, and because there was no specific program ready. The more irresponsible persons have stopped coming to meetings. There remains, however, a group of 25 or 30 gas model builders who attend regularly and who take active but orderly part in the serious discussions held.

Officers have been elected for a four month period as follows: Francis Tlush, President; Ortie J. Stevens, vice president; Richard Catlett, secretary. Discussion has been held on timing flights, amount of fuel to be carried, methods of construction, etc. Each week there will be topics for discussion. At the next meeting, for example, it will be "Motor Mount." Unit directors can get quite a few ideas on meeting discussions from the above. Mr. Berlinrut and the boys in his unit deserve praise for their fine work. In another part of this magazine you will find details of Tlush's plane which won the Texaco gas trophy at the Detroit meet. Good judgment of the Jersey boys was used when they elected Francis president of their group. He has proven himself an expert in gas powered model flight.

Philadelphia, Pa.

Mr. Jesse Bieberman, director of the Philadelphia Unit, reports taking five of the members to the National contest in Detroit and from there they traveled to Elmira, New York, the Soaring Society site, where a gas model meet was being sponsored. Of course the duration there was very low since the models were not in good condition and trouble with motors developed almost immediately. Mr. Bieberman deserves much credit for his work in stimulating gas model activities in Philadelphia. The place where present day gas model flying was born did not flourish in activity until Mr. Bieberman took it in hand. He reports steady growth in membership in his Unit.

New York

Mr. Irwin Polk, director of the Metropolitan Model League Chapter in New York has the largest Unit in the I.G.M.A.A. He reports his trip to Elmira with Raymond Heit a unit member as follows. "The trip was made on the way home from Detroit. When we arrived at the American Airlines airport in Elmira, we found a group from the Philadelphia unit as the only competition. In all there were seven contestants. While everyone else had much grief in starting their motors, Heit made an official flight with his seven foot span ship and kept the model

in sight for fourteen minutes which won him the $40 cash first prize. Heit refused to take any other official flights unless someone bettered his time. Needless to say no one did." An invitation for I.G.M.A.A. members to compete in next year's meet was passed on by Mr. Percy Pierce, director of the contest through Mr. Polk.

A meeting is being planned by this chapter where Mr. Grant will be guest speaker and movies of many interesting gas model flights will be shown. For further news write to "Gas Lines" MODEL AIRPLANE NEWS.

NOTICES

Members will be pleased to hear that a new type of coil for their engines has been placed on the market. It is a coil which will meet the most rigid test.

The first gasoline model airplane contest will be held in Denver, Colorado, July 3rd. (At the time this magazine went to press this date had passed but no word of the contest results had been received.) The contest is sponsored by the Denver Mile-Hi-Hats club under the direction of Tom Harsh, club director. It is to be part of the program of the air races to be held in Denver July 3, 4, 5.

Pete Dillon of West and St. Clair, Jackson, Michigan, passes on a worthwhile suggestion. He says: "I have found that a fiber battery case purchased from the five and ten cent store makes a lightweight and durable case for batteries for gas models. Take both positive and negative loads from the front and when it is necessary to change batteries, just unscrew the rear cap."

A flight that proves interesting is reported by the Daily Home News a New Brunswick, N.J., newspaper which tells of a two hour and fifteen minute flight made by the South River, N.J., High School Aero Club on June 24. The plane took off from Hadley Field with eleven thirty seconds of an ounce of fuel. The club members started a merry chase in an automobile to keep the craft in sight. It was recovered in Plainsboro, N.J. The model was a KG-3 built by John Czajkowski. The flight, of course, was unofficial since no official timer was present.

An item of interest was received from Ellis D. Weiner of 405 33rd Ave., San Francisco, California, who says, "Lightplane fans are not the only ones picked on by the Department of Commerce. Gas jobs in San Francisco are being clamped down on the grounds that they are 'uncontrollable aircraft'." We are not so sure that Weiner hasn't been doing a lot of back yard flying with his model since it seems logical that if builders flew their models at airports and large open fields far away from a thickly populated area, no complaints would ever come in. We ask all members to use their very best judgment in flying models. Any person capable of building a gas model should be fully convinced that a gas "buggy" is not a toy.

CONTEST

Another I.G.M.A.A. contest to be held at Hadley Airport, New Brunswick, N.J., on Saturday, October 10, 1936, is hereby announced. You know the rules. If not please look them up in the May issue. Entry blanks will be ready in two weeks and all those wishing to compete please send for them stating Unit No. if any. An addition to the application this year will be a space where you will enter the motor serial number. This is being done to protect members insofar as lost and misplaced engines are concerned. Engine numbers will be checked at every flight so if you are using more than one, please state so in your application.

Those who have already written in for their registration numbers for their models will receive them shortly. All members are urged to write in for their numbers since it will help identify their models at competitions. Every contestant in the coming meet should have his number. Write for yours now. Additional information on the contest will be found in the MODEL AIRPLANE NEWS, October issue on the stands September 8th.

The Clippers Head South

(Continued from page 5)

Obviously, as Uncle Sam now has actually established a colony on these islands, if the old maritime laws still hold, she is rightfully the owner of them. No one can find the old maritime laws as they were all amended and re-written during the various peace conferences held in Europe in the past two or three decades.

Uncle Sam now finds himself in the peculiar position of actually owning something he thought he did but didn't and England

finds herself not owning something she thought she did but didn't want anyhow, that is, until she watched with jealous eyes the advancement of the Clippers across the Pacific. The major nations of the world are now poring over records, re-establishing their claims to islands long since forgotten in the hope that she may reap some reward from the Clipper planes' intended routes to the South. Little wonder that so much importance has been attached to the Clipper's flights by all nations of the world. The Clipper is digging its nose into musty records, ferreting out ancient files heavy with age, and loosening the many tangles which have remained intact by a world who had neither the time nor inclination to do so. The Clipper with Uncle Sam backing her has both, consequently she's opening new air routes throughout the Pacific.

Now that we have established Uncle Sam's rights to the Islands, let's proceed with our story. Two monthly reports have come in from the tiny stations in mid-Pacific, irrespective of numerous daily radio messages. The most important news is that the prevailing northeasterly winds will aid the Clippers greatly in their flights to the south. Other technical data has been reported in from the lonely stations. Conditions have been found favorable for every detail of the flights with the one exception of the torturing heat which must be forever endured by the members of the base, should it be established. Pan American has solved this latter problem with her training station in Honolulu where she is training a hundred native youths in the proper manner in which to handle the huge ships when they come in for their scheduled stops. Mechanics are being trained by the efficient engineers of Pan American's staff to make necessary repairs on the flying boats when they land at the isolated bases. Conditions for the first two steps appearing favorable, let us move on southward and see just what conditions are for the remaining steps in the flight. From Jarvis Island, the next step is the 1,110 mile flight to Uncle Sam's Samoan Islands. There can be no question as to the legality of the United States' dominion over her portion of the group as she has had one of the world's largest Naval coaling stations there since the World War. It would be the work of only a few days to prepare the ideally situated harbor for aircraft operations and to establish a Clipper base. From Samoa stretches a 1,960 mile flight, the longest on the route, to the picturesque harbor at Auckland, New Zealand, the southern terminus of the flight. Extremely favorable conditions already exist in the harbor at Auckland as commercial and privately owned seaplanes have prepared a tiny seadrome which could easily be enlarged to fit the huge Clippers. Officials of the company have not as yet decided concerning the flight from Auckland to Sydney, Australia, the next logical step. Sir Charles Kingsford-Smith, before his untimely disappearance in his "Miss Southern Cross," had completed plans for his Tasmanian Airways and had also received official permission to begin experimental work on the Sydney to Auckland route. His wife, Lady Kingsford-Smith, is bravely carrying on her thrice-knighted husband's work and has already ordered a number of huge Douglas DC-2 Airliners which, at this writing, are in mid-Pacific en route to her. Pan American Airways has respectfully declined to contest Lady Kingsford-Smith in the Sydney to Auckland run. They have offered every aid to a brave woman carrying on in her courageous manner the work of a husband who was one of the bravest and most famous men in modern times.

With the news of all "these doings going on 'round hyah," Sir MacPherson Robertson, the genial chocolate candy magnate of Melbourne, who sponsored the famous London to Melbourne race a few months ago, has also stepped forth and offered his interest in aviation to those contemplating the linking of his city which he has made famous, with New Zealand and the rest of the world. Perhaps with his tremendous wealth and his enthusiastic interest in aviation, he may yet play an important part in the Clippers' southward linking of the Pacific.

A few brief words about equipment might prove interesting in closing. The huge Martin model 130 flying boats "China Clipper" and "Philippine Clipper" naturally hold the spotlight at present. However, it is a known fact that the Sikorsky, Consolidated, Boeing and Douglas companies now have, or soon will have under actual construction, huge flying boats of the general Martin Clipper types. Sikorsky has started actual construction on their huge new flying boat which has a wing span of 165 feet it is rumored. Consolidated has received an order for their new flying boat from a South American government. This new ship is a commercial passenger type version of their record breaking Navy XP3Y-1. Boeing, a former builder of seaplanes and flying boats for the Navy will soon begin production on a huge clipper-type ship. Douglas, whose recent expansion has made it the largest aircraft factory in the entire world now has approximately $10,000,000 worth of Army, Navy and commercial contracts on hand, have found little time or space in their factory to begin production on their mammoth sea airliner, engineering work on which has been completed.

As a result, Pan American is progressing rapidly in their new southern Pacific route, half a dozen of the world's largest aircraft plants are moving swiftly towards completion of giant flying boats, engineers are forging ahead toward the completion of the last gap in the linking of the world by air; in brief, the entire world is swiftly approaching man's dream of the ages, a round-the-world air line.

Aviation Advisory Board

(Continued from page 28)

gest for a model with high climbing and good gliding characteristics?

Answer: The U.S.A. 27 would be an excellent section for these conditions, or any section with a finesse ratio of one to seven or eight, and with a positive camber on the under surface near the trailing edge of the wing; such as many of the sections used on gliders. We also suggest the R.A.F. 32 section.

Mr. Owen Deters of 1251 Rutledge Avenue, Price Hill, Cincinnati, Ohio, has turned his attention to gas models, and like many others, he has been puzzled about

certain phases of the activity. He wishes to know:

Question: In gas model contests under National Aeronautic Association rules the fuel allowance is ¼ ounce of fuel for every pound of model weight. What is meant by the word "fuel"? Does "fuel" mean the mixture that enters the cylinder? How is it weighed?

Answer: "Fuel" in this case means the mixture of gasoline, oil or any other material that goes into the cylinder. It is weighed by liquid measure. Glasses calibrated for liquid measure in ounces and fractions of ounces may be obtained at any drug store.

Addison McNairy of 304 West Fisher Avenue, Greensboro, North Carolina, is rather perplexed about the operation of a gasoline engine. He says:

Question: Will you please explain the carburetor and the position of the intake and exhaust valves in a midget two cycle engine?

Answer: A needle valve serves the purpose of the carburetor. The suction from the engine draws the gas up from the tank through a small tube and out a very small hole in the back of the tube, which is exposed to the air stream which is being sucked into the engine. This air, passing by the small tube draws gas out of it in a fine spray. This spray mixes with the air and then vaporizes, forming a mixture of gasoline and oxygen which is burned when it reaches the cylinder and is ignited by the spark.

Question: Why are the intake and exhaust in a Brown engine in the same place?

Answer: We didn't know that they were in the same place. The exhaust valve, or port, is located in the rear of the cylinder wall at a point slightly above the lowest point to which the piston will descend in the cylinder while the engine is running.

The intake valve should be in the front cylinder wall very slightly below the exhaust port. When the explosion takes place and the cylinder is forced down, the piston passes the exhaust port first, the burned gases passing out through this port. In the next instant, the piston passes the intake port and the suction produced by the exhaust coming out of the cylinder and the compression in the crankcase, causes the gasoline vapor to enter the cylinder through the intake port. When it rushes in, it helps to force out the burned exhaust gases.

The needle valve described above is the simplest way to vaporize gasoline for use in a gas engine.

Next month we have many more questions which we are sure will be of interest to our readers. Until then, happy landings!

Air Ways—Here and There

(Continued from page 29)

102 North Broadway, Bull, Idaho. He tells as follows:

"I had both planes out on a windy day in order to take pictures of them sitting on the ground. A gust of wind caught the Lockheed and lifted it about fifteen feet up and carried it about twenty feet and then set it down without mercy, just missing the YA-8 beside it. I got the two pilots of the YA-8 and stood them up with a stretcher in their hands and a man in it. The picture shows the act of mercy."

The YA-8 was not damaged because it was a much heavier model than the Lockheed. Berry says that he is glad it was unharmed as this ship is perfect in every detail and resembles the real plane exactly. It required 245 hours to build. It has won a first prize to its credit so far.

Sometime ago Henry Clark of 46 Fort Washington Avenue, New York City, submitted a picture of a small ten inch model. He goes us one better this time and sends us a picture of a six inch model with a quarter standing on edge beside it to show the comparative size. It is shown in picture No. 4. The ship is a Vought Corsair SU-2. It is made of solid balsa and is painted with a very brilliant finish.

Another member of our Air Ways Club, Mr. M. Walter Munk of 1103 Delaware Avenue, Wildwood, New Jersey, sends us picture No. 5. It shows his scale DH-4 which is completely detailed with the exception of the movable controls, which do not operate from the cockpit. All parts are constructed by hand except the wheels. Attention is called to the pro-

peller of this job. It is an unusually fine piece of work. This model won the second prize of $10 for its builder at a local contest. Those familiar with the De Havilland 4 can recognize in this model a fine counterpart of the big ship.

We have a suggestion from Hollis Sanders of the United States Navy. He says:

"Why not start a cross word puzzle in each issue that deals with aviation terms only. It will go a long way to broaden the minds of not only the beginners but the old timers as well."

What do our readers think of this suggestion? We are wondering if they do not have enough problems to solve which will be more productive of actual results.

J. A. Grasham of 1110 East Osborn Road, Phoenix, Arizona, writes and tells us of the extreme interest in model planes in his vicinity. He says there are very few facilities for model building in that part of the country but they have built some very successful models. Enough interest has finally been stimulated to form a club of several builders, which is sponsored by Mr. Gaylord Webster. Shortly after, a second club was formed in one of the schools, called the Flying Coyotes. Several contests since then have been held in which these clubs have taken part.

Recently Wing Jung set a new "Salt River Valley" record for Class C fuselage models with a flight of seven minutes, thirty-six seconds. Jung's plane was followed for four miles by a party in an automobile before it was lost. It was never recovered. Mr. Grasham says that he was second with a flying time of two minutes, forty-four seconds. These young men, we are proud to say, are members of our Air Ways Club.

MODEL NEWS FROM OTHER COUNTRIES

England

In order to choose a team to compete in the Wakefield Contest, elimination trials were held at the Great West Aerodrome, Hayes, Middlesex, England, on May 27th. Picture No. 6 shows one of the contestants who is shown busily engaged in preparing his model for this event. Only the finest model builders competed in the eliminations. This young man, however, was not fortunate enough to be chosen as one of the team. Many readers will recognize the model shown in the picture as having characteristics of Grodon Light's Wakefield entries. This type of model seems to be very popular for contests.

France

Mr. J. Mahn, Secretary of the Escadre de la Rose des Vents of 2 Brd. des Filles du Calvaire, tells us that during the winter many exhibitions of models were held. These exhibitions not only included models but small light planes, such as the Pou du Ciel. At one of the shows held by the Air Club of France with the help of the Ligue Aeronautique, the Escadre de la Rose des Vents was designated as the premier model club of France. The second place was won by the model department of the Aero Club du Harve and the third place went to the Model Air Club de France. This show lasted for two weeks, at the termination of which a committee of model planes was organized which will supervise all the French club activities.

Mr. Mahn writes us that they are now running model speed contests in France. Such a contest, under the name of Deutsch de la Meurthe Cup, was run at the beginning of the summer. The winner was M. Damhet with an average time, on a fifty metres base run twice, 6⅘ seconds for an average speed of 28 kilometers. M. Degler was second with an average speed of 19 km. and Mrs. Leroy was third. The highest speed on one base was run by Mrs. Leroy with 33 kilometers. Many contests for gliders and model planes were held during the summer months.

England

Mr. Charles Eric Sargeant of 38 Lascelles Road, Dover, Kent, England, writes to tell us that he has devised an original method of constructing accurate scale models. He says:

"My methods are quite unorthodox, the materials used are 90% cardboard, 5% adhesive paper and 5% incidental materials such as thread, gum, glue, etc."

Would model builders be interested in knowing more details of constructing this type of model?

South Africa

We have word from Henry Du Plessis of 8 Tulbagh Street, Worcester, South Africa. He says in his letter to us:

"I have beaten Bob File's glider record which was 23 minutes, 16 seconds. On February 19th, 1936, I put up the glider I made from plans which appeared in your magazine, for fifty-three minutes. I have received a certificate from the South African Model Plane Club to acknowledge this world's record. Mr. Lilly of Worcester holds the South African record, which is thirty minutes. I am second with a time of twenty-six minutes, fifteen seconds."

It appears that no one country has a "corner" on model records, especially as England now holds the Wakefield Cup and New Zealand the Moffett Trophy. It looks as if the Americans were going to have to do a little travelling about the world in the future.

Holland

We hear from Holland for the first time. Mr. Henry de Keijserpl of the Amsterdamse Vliegtnigmodel Club "District V," 6'. Amsterdam (Z), Holland, sends us word that his club is exceedingly active in model plane work. During the last three days in August 1936 an exhibition of model planes will be held. He says:

"We wish to give this an international character and will welcome any entries from any parts of the world. We shall be glad to receive books, models, pictures or other matter pertaining to model plane work."

Mr. Keijserpl is extremely interested in hearing from American model builders and American model clubs. Some of the American builders may find it interesting to exchange ideas with their friends in Holland.

GENERAL CLUB NEWS

Indianapolis

On June 6th, the R. F. Taylor Aviation Post No. 121 of the American Legion held a contest at Stout Field, in Indianapolis. Picture No. 7 shows the judges and the winners. In the front row, left to right, Bert Pond, Peru, Indiana; Fred Cooke, Indianapolis; Robert Kreigh, Huntington; Ralph Holmes, Indianapolis; Prof. G. W. Haskins, Purdue University. Rear row, left to right, Eldon Ralstin, Peru; Bill Canaday, Indianapolis; Carl Housefield, Indianapolis; Charles De Moss, Indianapolis.

Saint Louis

The Stix, Baer & Fuller Model Airplane Club of St. Louis, Missouri, has just published the first issue of its club paper, "The Aeronautical Reporter," which has been long awaited by many of the club members. It is devoted to the best interest of the boys in model airplane work. "The Aeronautical Reporter" will be published bi-monthly on the first and third Saturdays of each month. It promises to offer to its readers such columns as: Club Chat, by the well-known professor of blitz, Dr. B. A. Pylitt, Science Nibbles, Helpful Hints on Model Building, a Question and Answer Column, jokes, cartoons, announcements and many other items of interest. The paper is composed of contributions from its readers and the editor will welcome any assistance from the club members which will provide interesting reading and enjoyment.

We congratulate the Stix, Baer & Fuller Club on the presentation of its paper. We wish it every success. Possibly model builders outside of St. Louis will be interested in this worthy sheet, as well as club members.

Chicago

The Craft section of the Chicago Park District recently held a Class A Glider event. In the Senior class Charles Belsky was winner with a time of 44.9. Dick Obarski was second with a time of 41.5 and Wallace Simmers was third with 37.8. All these winners were members of the "Aeronuts" club. It is interesting to know that the winners of the first eleven places were members of the "Aeronuts." In the Junior class, Richard Crenshaw was the winner with a flight of 29.9. Robert Braun was second with a time of 28.6 and Seymour Goldstein was third with a time of 28.

Burlington

Intense interest in aviation has sprung up in this city of the "Green Mountain State." Sam B. Card of Fort Ethan Allen, Vermont, who is an ardent model enthusiast, has been kind enough to send us the results of the second annual State Y.M.C.A. Model Airplane Contest which they held there recently. In the junior division, the Flying Scale event was won by Lloyd Church, Jr., with a time of ten seconds. The Scale event was won by Vernon Winkel with ten points. The Baby R.O.G. event was won by William Bowley with a time of one minute, fifty seconds. He also won the Indoor Tractor event with a time of ten seconds. High point winner was William Bowley with twenty points, Lloyd Church was second with seventeen, and Vernon Winkel third with ten points.

In the senior division, the Scale event was won by Clifford Backup with ten points. J. J. Webb, Jr., won the Flying Scale event with a time of thirty-four seconds. The Baby R.O.G. event was won by Sam Card with a flight of two minutes, fifty-three seconds. Clifford Backup won the Indoor Tractor event with a time of four minutes, six seconds. High point winners were Clifford Backup, with twenty-seven points, Sam Card with twenty-four and J. J. Webb, Jr., with twenty points.

Air Ways Club

Unquestionably many of our readers will want to know more details of the Air Ways Club. This organization is an association of model builders and model building clubs who have for their object the advancement of model aviation and the increase of knowledge concerning all phases of this constructive sport and hobby. Their purpose also is to develop and pass on to other club members new ideas and information concerning model design, building and flying, in order that through this activity, they may attain a complete knowledge of things aeronautical, and thereby fit themselves for a career in aviation and help their country in this great field of transportation.

Who May Belong

Any model builder who is sincerely interested in model planes may belong to this club, either as an individual or as a member of a unit. A unit of the Air Ways club may be any club which is already formed and operating, or any group of model builders may get together and form a unit if the number of members in the unit is five or more. There are no special dues, rules or laws which units or members must follow. The Air Ways club is merely an association of clubs. Any club or unit may operate under its own laws and dictates, holding its meetings and continuing its activities as it sees fit. However, the association reserves the right to expel any club who is not a credit to the association in respect to its behavior and in the manner in which it carries on its activities.

It will interest club members to know that the Air Ways Club is establishing a beautiful silver trophy for the greatest flight duration for all rubber-powered

models, irrespective of model type. This trophy will go to the Air Ways Club member establishing the greatest duration under the National Aeronautic Association rules after September 1st, 1936.

All model clubs who are not units of the Air Ways Club are invited to join, also any individual model flier who is interested in this art. All that is necessary is to write in for an application blank or fill in the application which appears at the bottom of this column. It is desired by the Air Ways Club to make this organization one big brotherhood. News of interesting activities will be published in the Air Ways columns in future issues of MODEL AIRPLANE NEWS. Join Now.

The 1936 "Nationals"

(Continued from page 26)

by United Air Lines, and a life subscription to "Model Aircraft Builder." Following him were:

2. Robert Copland, 18, London, England, 20 07. Awarded Whitfield Trophy.
3. Joe Nagy, 16, Cleveland, Ohio, 18 01.6
4. Robert B. Shea, 19, Boston, Mass., 17 04
5. Jean S, Chadwick, 19, Syracuse, N.Y., 10 08.8
6. Charles Belsky, 17, Chicago, Ill., 9 38
7. Roy E. Stoner, 15, Rockford, Ill., 6 38
8. William Ying, 17, Staten Island, N.Y., 6 23.6
9. Torrey L. Capo, 19, Quincy, Mass., 5 02
10. Fred Hollingsworth, 19, Vancouver, B.C., 4 57
11. Kenneth Ernst, 20, Indianapolis, Ind., 4 55.1
12. A. A. Judge, 18, London, England, 4 31.5
13. John Kubilis, Jr., 18, Chicago, Ill., 4 00
14. Mike Karlak, 19, Cleveland, Ohio, 3 52.1
15. Lawrence Eisinger, 16, Staten Island, N.Y., 3 26
16. Fred A. Mayfield, Jr., 18, Akron, Ohio, 3 24.1
17. James McCoy, Wilkinsburg, Pa., 3 13.7
18. George E. Henderson, Jr., 19, Asheville, N.C., 3 12
19. Edward Naudzius, 17, Detroit, Mich., 3 09
20. James Cahill, 18, Indianapolis, Ind., 3 02
21. W. Hewitt Phillips, 18, Belmont, Mass., 2 58
22. Carl Hawkins, Jr., 19, Toledo, Ohio, 2 56.2
23. Lawrence Harlow, 15, Indianapolis, Ind., 2 46.8

Chester Lanzo of Cleveland, Ohio, won the Outdoor Contest for Cabin Fuselage Models, R.O.G., Open Age Class with an age limit of over 21. His time was 48 min., 45 sec. He won the Megow Trophy and a year's subscription to "The Model Craftsman". Other winners were:

2. Richard Korda, Cleveland, Ohio, 12 04.6. Awarded Detroit Times Trophy.
3. Vernon Boehle, Indianapolis, Ind., 6 30
4. John Young, New York City, 3 46
5. J. B. Allman, Birmingham, England, 3 32.5
6. Dick Bodle, Akron, Ohio, 3 31.2
7. Roy Wriston, Tulsa, Oklahoma, 3 15.2
8. Louis Garami, Jackson Heights, N.Y., 2 29
9. Ira J. Fralick, Syracuse, N.Y., 2 00.8
10. William E. Atwood, Glendale, Calif., 1 50.4
11. Irving L. Hoyser, Syracuse, N.Y., 1 41.8
12. Robert J. Cahill, Indianapolis, Ind., 1 35.2
13. Frank Zaic, New York, N.Y., 1 33
14. Raymond E. Podolsky, St. Louis, Mo., 1 28
15. Jesse Bieberman, Philadelphia, Pa., 1 23

The Texaco Contest for Gasoline Powered Models with an age limit of over 16 and under 21 was won by Francis J. Tlush, 19, Lyndhurst, New Jersey. His time was 45 min., 34.5 sec. His prizes were: Texaco Trophy for one year and a miniature permanently, year subscription to MODEL AIRPLANE NEWS, life subscription to "Model Aircraft Builder," $25 merchandise order by "The Model Craftsman". Those who also placed were:

2. W. Hewitt Phillips, 18, Belmont, Mass., 30 12. Awarded Model Craftsman Trophy. One Tlush Super Ace Engine.
3. Joseph H. Buehrle, 17, North Littlerock, Ark., 27 50. Awarded smaller Texaco Trophy.

4. Michael Granieri, 16, Newark, N.J., 26 40
5. De Witt Ross, Jr., 16, Tulsa, Oklahoma, 26 33.5
6. Roderick Doyle, 20, Alameda, Calif., 26 15
7. Hubert Bodinet, 17, Chicago, Ill., 22 21.8
8. Carl Hawkins, Jr., 19, Toledo, Ohio, 22 00
9. Fred Gerling, 19, Columbus, Ohio, 20 11
10. Harry T. Wetzel, 16, Santa Monica, Calif., 20 10
11. Reuben Snodgrass, 17, Tulsa, Oklahoma, 20 00
12. Frank Broeg, Jr., 17, Burlington, Iowa; John Igoe, 16, Burlington, Iowa 18 48.2
13. E. Carlton Harris, 19, Buffalo, N.Y., 18 16.8
14. Alvie Dague, Jr., 16, Tulsa, Oklahoma, 18 00
15. William Effinger, 19, Brooklyn, N.Y., 17 06
16. Jack Forbes, 16, Rolla, Missouri, 16 00
17. Kenneth Ernst, 20, Indianapolis, Ind., 15 03.1
18. Barnarr Anderson, 20, Akron, Ohio, 14 12
19. Joe Dallaire, Jr., 17, Detroit, Mich., 13 45
20. Dale Kooser, 17, Mansfield, Ohio, 12 20
21. Ira J. Hassad, 20, Los Angeles, Calif., 11 40.5
22. Henry Stadelmeier, 17, New York City, 11 30

The Open Age Class, age limit over 21, Gasoline Powered Model Contest was won by Michael Kostich of Akron, Ohio, who set a new open class record with a time of 36 min., 52.2 sec. He won a Baby Cyclone engine, the Model Craftsman Trophy, subscriptions to MODEL AIRPLANE NEWS and "The Model Craftsman". Other winners were:

2. Melvin H. Yates, Joliet, Ill., 27 32. Awarded the Whitfield Trophy.
3. Dick Bodle, Akron, Ohio, 25 27
4. Raymond E. Podolsky, St. Louis, Mo., 24 59
5. Vernon Boehle, Indianapolis, Ind., 24 39
6. Harold Stofer, Indianapolis, Ind., 24 36
7. Winford Davis, Kansas City, Mo., 23 12.8
8. Richard Staab, Akron, Ohio, 21 45
9. William E. Atwood, Glendale, Calif., 21 44.2
10. Michael J. Roll, Dearborn, Mich., 20 44.6
11. Louis E. Schock, Los Angeles, Calif., 19 45.4
12. John S. Young, Kansas City, Mo., 15 51.3
13. Alan D. Booton, Asheville, N.C., 13 42
14. Bob File, Columbus, Ohio, 13 13
15. Emanuel Radoff, Newark, N.J., 7 13.4
16. Eddie Stender, Lyndhurst, N.J., 6 17.2
17. P. J. Sweeney, Chicago, Ill., 6 16.4
18. Jack V. Tighe, Chicago, Ill., 4 53.3
19. Frank Dallaire, Detroit, Mich., 4 09.8
20. Floyd Steinberg, Flint, Mich., 4 07.2

In the Stout Indoor Contest for Hand Launched Stick Models, age limit under 21 years, the winner was John Haw, 20, Philadelphia, Pa., with a time of 18 min., 10 sec. He was awarded a round trip from Detroit to Washington on the Central Airlines, $10 merchandise order by "The Model Craftsman", the Stout Indoor Trophy for one year and a miniature permanently, a subscription to MODEL AIRPLANE NEWS and life subscription to "Model Aircraft Builder". The others who placed were:

2. Bruno Marchi, 20, Medford, Mass., 18 01.4. Awarded Central Airlines Trophy.
3. Wilbur F. Tyler, 19, Everett, Mass., 17 52.5. Awarded Comet Trophy.
4. John Ginnetti, 20, Atlantic City, N.J., 17 52
5. Roderick Doyle, 20, Alameda, Calif., 17 20
6. Donald Godfrey, 17, Detroit, Mich., 17 02
7. Torrey L. Capo, 19, Quincy, Mass., 16 59.2
8. W. Hewitt Phillips, 18, Belmont, Mass., 16 46
9. Dick Everett, 18, Elm Grove, W. Va., 16 40
10. John Foster, 16, Indianapolis, Ind., 16 33
11. Lawrence Smithline, 19, New York City, 16 30
12. Roy Marquardt, 18, Burlington, Iowa, 16 26
13. Robert Jacobsen, 16, Philadelphia, Pa., 16 16.1
14. Roy A. Carlson, 16, Springfield, Mass., 16 11
15. Wallace Simmers, 17, New Lennox, Ill., 15 50
16. Fred A. Mayfield, Jr., 18, Akron, Ohio, 15 33.3
17. Frank Kiewicz, 19, Detroit, Mich., 15 16
18. Jean S. Chadwick, 19, Syracuse, N.Y., 15 15
19. Sidney Axelrod, 17, Chicago, Ill., 14 47
20. Frank Haynes, 20, New York City, 14 30
21. Maurice Arnold, 17, Columbus, Ohio, 14 30
22. Walter Good, 20, Kalamazoo, Mich., 14 23
23. Jack Greenwell, 19, Toronto, Ontario, 14 12

The winner of the Springfield Contest for Indoor Stick Models, Hand Launched, with an age limit of over 21, was Carl Goldberg, of Chicago, Illinois. His prizes were: the Springfield Trophy for one year and a miniature permanently and a subscription to "The Model Craftsman". His winning "Model Aircraft Builder". Other winners were:

2. Roy Wriston, Tulsa, Oklahoma, 17 56.1. Detroit Times Trophy.
3. Joseph P. Matulis, Chicago, Ill., 17 55
4. Ira J. Fralick, Syracuse, N.Y., 16 45
5. Gordon Johnstone, Detroit, Mich. (New Class "B" open age class record) 16 23
6. Willis C. Brown, Arlington, Mass., 16 06
7. Chester Lanzo, Cleveland, Ohio, 14 44
8. Fay Stroud, Detroit, Mich., 14 32
9. William E. Atwood, Glendale, Calif., 14 21
10. Michael J. Roll, Dearborn, Mich., 11 15
11. Ernest A. Walen, Springfield, Mass., 10 38.5
12. Robert J. Cahill, Indianapolis, Ind., 10 33.3

Alvie Dague, Jr., 16, Tulsa, Oklahoma, won the Bloomingdale Contest for Indoor Cabin Fuselage Models, age limit under 21, with a flight of 16 min., 17 sec. His prizes were: round trip from Detroit to Washington by Pennsylvania Airlines, holds Bloomingdale Trophy for one year and miniature permanently, subscription to MODEL AIRPLANE NEWS and life subscription to "Model Aircraft Builder." Other winners were:

2. John Haw, 20, Philadelphia, Pa., 14 54. Paul Guillow Cup
3. Albert W. Courtial, 19, St. Louis, Mo., 14 31.8. Detroit Times Trophy

4. John Ginnetti, 20, Atlantic City, N.J., 14 00
5. William E. Gough, Jr., 19, Chicago, Ill., 12 55.8
6. Walter Good, 20, Kalamazoo, Mich., 12 10
7. Lynn Radcliffe, 15, Syracuse, N.Y., 11 45
8. Ervin Leshner, 17, Philadelphia, Pa., 11 33
9. Roy A. Carlson, 16, Springfield, Mass., 11 30
10. Daniel J. Clini, 19, Springfield, Mass., 11 05.2
11. Torrey L. Capo, 19, Quincy, Mass., 11 00
12. Herbert J. Greenberg, 20, Newark, N.J., 10 55
13. Edward I. Manulkin, 18, Philadelphia, Pa., 10 42
14. Paul N. Gustafson, 16, Columbus, Ohio, 9 39.5
15. Roy Marquardt, 18, Burlington, Iowa, 9 38
16. De Witt Ross, Jr., 16, Tulsa, Oklahoma, 9 25
17. Paul Verdier, 15, Ottawa, Ontario, 9 07
18. Jean S. Chadwick, 19, Syracuse, N.Y., 8 15
19. W. Hewitt Phillips, 18, Belmont, Mass., 8 07
20. Richard L. Sloane, 18, Columbus, Ohio, 8 02

The Indoor Cabin Fuselage Models R.O.G. Open Age Class, age limit over 21, was won by Joseph P. Matulis, Jr., Chicago, Illinois, with a flight of 11 min., 21.5 sec. He won the Jimmie Allen Trophy, a gold medal and a subscription to "The Model Craftsman". Other winners were:

2. Jessie Bieberman, Philadelphia, Pa., 10 25. American Airlines Trophy.
3. Teen Becksted, Chicago, Ill., 9 37.5
4. Ira J. Fralick, Syracuse, N.Y., 8 05
5. Chester Lanzo, Cleveland, Ohio, 7 35
6. Roy Wriston, Tulsa, Oklahoma, 6 38
7. John T. Dilly, Galt, Ontario, 5 50
8. Ernest A. Walen, Springfield, Mass., 4 47
9. Nigel Jones, Bralorne, B.C., 4 13

Designing Your Fuselage Model

(Continued from page 27)

senting the C.G. of the stick model. This fact causes the C.G. to be located nearer the thrust line. Thus in order to keep the distance between the C.G. and the C.L. equal to 1/6 of the distance (M), which insures longitudinal stability, the C.L. must be raised. This means raising the wing which in turn raises the C.G. still further.

It is obvious from this that it is advantageous to keep the center of weight of the fuselage as low as possible. This can be done by making the top of the fuselage close to the line of thrust and bellying down the underside as shown in Fig. No. 117. Even under these conditions however, the C.G. usually is higher in the fuselage model than in the stick type. Whereas in the case of the stick model the C.G. is (1/12 M) below the thrust line, it is usually only (1/24 M) below this line in the fuselage plane unless very heavy wheels are used to keep it low and well forward. It is assumed that when the C.G. is said to be raised to this position that the C.L. and therefore the wing has been raised sufficiently to give added stability to compensate for the loss in stability caused by the C.G. being nearer to the thrust line. Actually if the C.G. is raised a distance of (1/24 M) or ½ inch nearer the thrust line, the center of lift will have to be raised from its old position a distance which is twice as great, or *one inch*. This may be checked by an investigation of the formula for stabilizer area given on page No. 13 of the July issue. Then instead of it being one inch above the thrust line, the C.L. will be 2 inches above it. These new positions of the C.G. and the C.L. are shown in Fig. No. 116. In referring to this position of the center of lift, it is meant that this is the lowest position that the C.L. should assume in fuselage models which are to have a high degree of stability. All other factors being equal, a model of this type will be less stable if the C.L. is located below this point. It is true that the position of the C.L. is one factor in locating the wing but the position of the top of the fuselage determines whether or not the final position of the C.L. will be above the lowest advisable position mentioned above, and whether the wing should rest on the top of the fuselage, or be located in a parasol position above it. A mid-wing or a low-wing position is not worth consideration because in such cases the C.L. is too low and the C.G. is too high.

You will recall that it has been shown that the top of the fuselage should be as close to the thrust line as possible in order to keep the C.G. low. This also helps to keep the position of the center of lateral area low, which brings us to one of the most important considerations in fuselage model design; namely, the advisable position of the center of lateral area of the airplane (direction center). It should be located to the rear of the center of gravity a distance equal to about 15% of the total length of the fuselage and *on a horizontal* line drawn through the center of gravity. (See Fig. No. 116.) If it is above the center of gravity the model will have a tendency to bank excessively on *fast* turns and dive in towards Mother Earth. Such a condition usually results in a tight spiral

which tightens more and more as the spiral progresses, with a crash as the ultimate result. This fault is quite common to some gas models at the present time. It is hoped that this hint will be taken and applied by gas model fans. If they apply it to their planes great improvement in the performance of their models will be insured and fewer crashes will result.

Locating the center of lateral area slightly above the C.G. may not cause very noticeable disadvantages, for the spiral instability is proportional to the distance that the center of lateral area is located *above* the C.G. If the former point is well above the C.G., you may be sure that it will be unstable in certain phases of flight, unless the wing is located in an extreme parasol position. The extreme stability derived from this may compensate to a certain extent for the faulty directional center location. Nevertheless it will detract from the flying capacity of the airplane.

In the force diagram of your model, you should locate the point representing the correct position of the directional center on a line with the C.G. horizontally, and 10% of about 18 inches or 1.8 inches to the rear of the C.G.

Now you have the forces of your fuselage job set up in an ideal arrangement for stability. It remains now for you to determine the model's structural set-up.

Structural Arrangement

As far as possible, the structural characteristics of this model will be made the same as the stick model. The first structural factor to consider is the wing. A span of 24 inches has been decided upon. The chord may be 3 inches and the camber 1/12 the chord or ¼ inch, as in the case of the stick model. The dihedral cannot be established until the exact position of the top of the body has been located.

Propeller

The rule for the propeller diameter is make it equal to:—from 1/3 to ½ the wing span. A diameter of 9 inches was chosen for the propeller of the stick model. However for your fuselage model it is advisable to make it with a diameter which is slightly less than this in order to reduce the propeller torque to a minimum. In fuselage models more rubber is required in the motor than in the stick model due to its greater weight. This will make the torque larger unless the diameter is reduced.

Therefore for stability's sake, the minimum diameter of 1/3 the wing span or 8 inches will be selected. As in the stick model design a pitch of (1.4) times the diameter will be satisfactory. Thus it will be 1.4 x 8" or 11.2 inches.

If the width and depth of the propeller block is (1.62) and 0.723 respectively, the same as the block specified for the stick model, the pitch will be 11.2 inches, or 8/9 of the pitch of the stick model propeller. However the blade area will be also 8/9 of the blade area of the stick model propeller. This will not be sufficient, for the wing area of the fuselage model is the same as the stick model and the propeller blade area should be proportional to the wing area. The blade area of the 8" propeller, therefore must be the same as the 9" stick model propeller. To obtain such a propeller, all that is necessary is to make the depth and width of the propeller blank 9/8 of the depth and width measurements given above. The depth would be then, (0.813) inches and the width (1.82) inches. Thus the correct measurements of the propeller blank have been established.

Location of Top of Fuselage

The next step is to locate the top of the fuselage for the wing dihedral and the tail areas cannot be determined until this is done. The top of the fuselage may be as near the center line of the motor, or line of thrust as 3% of the fuselage length, or in this case about ½ inch. The closer it is located to the thrust line the better it is as regards stability, so its location will be established at this point, measured at the wing position. The fuselage top should extend in a graceful streamlined curve from the nose through the point ½" above the thrust line at the wing, to a point at the tail about 5/16" above the thrust line at the extreme rear end of the fuselage.

Wing Position and Dihedral

Now that location of the top side of the fuselage is known, the wing position relative to it and the amount of dihedral required can be determined. The dihedral should be determined first. The C.P. has been raised to a position which is 2 inches above the thrust line. This was required, you will remember because the C.G. was raised from a point one inch below the L.T. to a point ½" below it. Raising the wing ½" more above the C.G. in this way increased the effect of any given amount of dihedral angle as regards its effect on lateral stability. For details see Chapter No. 3 on stability. Therefore the dihedral angle need not be so large as in the case of the stick model. In fact it may be only half as large and yet have about the same effect.

So if we select a dihedral in which each wing tip is raised ⅞ inch per foot of span, or 1¾ inches it will be equal to half the dihedral of the stick model. This value of the dihedral requires that the center point of the upper camber of the wing shall be located 5/16" above the top of the fuselage, in order to have the C.P. of the wing at the point which was *selected* for the center of pressure shown in Fig. No. 116. Then the underside of the wing center section ribs will be ⅜" above the top of the fuselage as the camber of the wing is ¼". Thus the wing C.P. will be (⅜"+¼"+⅞") or 1½" above the fuselage top. The selected C.P. point is 1½ inches above the fuselage top. The wing C.P. will coincide exactly with it if the wing is located as described.

Thus the amount of dihedral, the position of the center of gravity, the center of lift, the top of the fuselage and the wing have been established relative to the line of thrust. Fig. No. 117 shows the arrangement of these factors as described. This set up of forces will insure a stable model. It is essential, however, that the C.G. is located at the point shown in the diagram.

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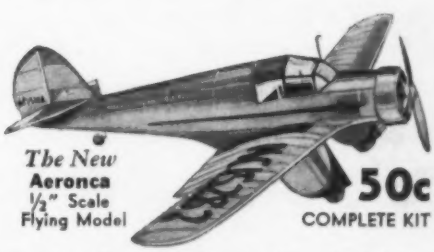

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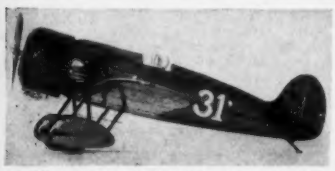

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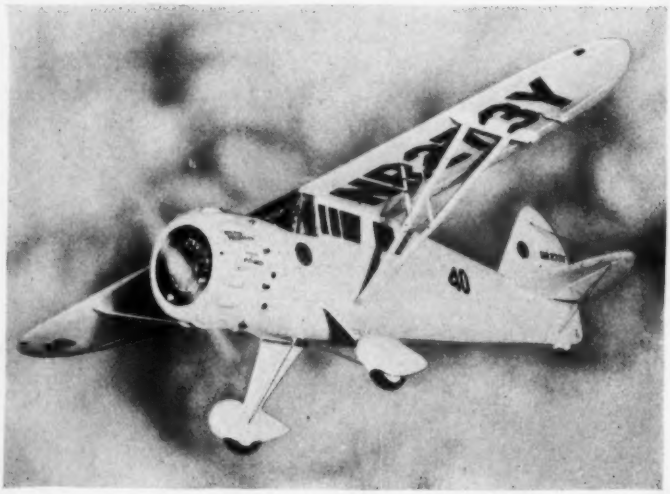

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D-24	Lockheed Vega	20 1/2	.85
D-26	Heath Parasol Sport	15 1/2	.35
D-27	Doolittle's Gee-Bee	12 1/8	.50
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D-35	Boeing 247 Transport	36 7/8	2.50
D-36	Lincoln Spcrplane	10	.75
D-37	Waco C Cabinplane	16 1/2	.75
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D-42	Howard "Ike" Racer	10 1/8	.25
D-43	Douglas O-38 Obs.	20	.85
D-45	Martin Bomber	35 3/8	2.50
D-46	Laird Solution Racer	10 5/8	.50
D-47	'32 Wedell's W. Wms.	13	.50
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